Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Digital Broadcast Copy Protection	)	MB Docket No. 02-230
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COMMENTS OF PUBLIC KNOWLEDGE AND CONSUMERS UNION

Gigi B. Sohn
John T. Mitchell
Public Knowledge
1875 Connecticut Avenue, NW
Suite 650
Washington, DC 20009
(202) 518-0020

Christopher Murray
Consumers Union
1666 Connecticut Avenue, NW
Suite 300
Washington, DC 20009
(202) 462-6262

Counsel for Public Knowledge and Consumers Union

Nathan Mitchler
Law Clerk
Public Knowledge

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To: The Commission

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Public Knowledge and Consumers Union (hereafter "Consumer Groups") hereby submit these comments in connection with the Commission's *Notice of Proposed Rulemaking* FCC No. 02-231 (released Aug. 9, 2002) ("*NPRM*") in the above-captioned proceeding

I. SUMMARY AND INTRODUCTION

The two groups that are submitting these comments each play a unique role in advocating and protecting citizen interests as they may be affected by changes in technology policy and regulation. Public Knowledge is a nonprofit advocacy and educational organization that seeks to address the public's stake in the convergence of communications policy and intellectual property law. Consumers Union, publisher of *Consumer Reports,* is an independent, nonprofit testing and information organization serving only consumers. Its advocacy offices and the Consumer Policy Institute address the crucial task of influencing policy that affects consumers.

The Consumer Groups support the paired goals of promoting both high-definition television (HDTV) and digital terrestrial television broadcasting (DTTV), sometimes

referred to together as "DTV."[1] Further, we are committed to the protection of copyright, and we support creators' and publishers' prerogative to protect their copyright interests through technical means. Consumers have valid interests in the protection of copyrighted works, and particularly in rewarding creators to ensure the availability of a rich variety of content, as well as in the commercial viability of those businesses and enterprises who transmit or otherwise make that content availability to the public. At the same time, consumers also are concerned that their reasonable expectations with regard to the functionality, convenience, and cost of television receivers and display devices, personal computers and related devices, and other digital and consumer-electronics devices be maintained, to the extent possible, by any government regulation aimed at copyright protection through technological means. We note that this is an area in which, if the Commission acts imprudently, the result could be serious economic and non-economic harm, affecting a majority of Americans who view TV, or who use computers and other digital tools.

For this reason, the Consumer Groups urge that the Commission take adequate time for deliberation, including further private and public processes for fact-gathering, before going forward to devise and implement a rule centering on the broadcast-flag scheme. We also state at the outset that we have doubts about the wisdom of a broadcast-flag rulemaking at this time, for the following reasons: (1) implementation of the broadcast-flag scheme could adversely affect consumers, by limiting or eliminating reasonable and lawful consumer uses and increasing the cost and inconvenience of consumer technologies, (2) the broadcast-flag proposal as presented in the *BPDG Final Report*[2] is inadequate to protect copyrighted works, (3) the premises offered in the *NPRM* as justification appear to be questionable, and (4) any implementation of the broadcast-

[1] We use "DTV" in the context of the broadcast-flag discussion to refer primarily to HDTV and secondarily to any digital "high-quality" television content.
[2] *Final Report of the Co-Chairs of the Broadcast Protection Discussion Subgroup to the Copy Protection Technical Working Group* (June 3, 2002) [hereinafter *BPDG Final Report*].

flag proposal that might even approach effectiveness would require a very broad regulatory framework that extends beyond the Commission's statutory jurisdiction to a wide range of technologies that have not previously been considered to be subject to broad Commission regulation. We elaborate on these reasons in the discussion below.

II. IMPLEMENTATION OF THE BROADCAST FLAG SCHEME COULD ADVERSELY AFFECT CONSUMERS BY INCREASING THE COSTS AND INCONVENIENCE OF CONSUMER TECHNOLOGIES

The Commission seeks comment on a broad range of questions concerning the impact of "the ATSC flag or other digital copy protection mechanisms on consumers."[3] Specifically, the Commission seeks comment on the cost a broadcast flag might have on consumer electronics equipment, and the impact a flag might have both on legacy and future electronic equipment.[4]

As a general matter, the Consumer Groups believe that there has not yet been adequate discussion and fact-finding concerning the potential impact on consumers of implementation of a broadcast-flag. Part of the reason for this lack of discussion has been that the scope of the broadcast-flag regulation is unclear from the *BPDG Final Report*, although, as we note in Section III *below*, many technologists believe that the only implementation of the broadcast-flag proposal that might achieve the stated goals of the proposal is a broad one.

But whether implementation is broad or deliberately "narrow," we believe generally that the Commission must hold further hearings and engage in other fact-finding before any rulemaking imposing a broadcast flag, and must in particular seek feedback from consumers and independent economists and technology experts regarding both the likely direct impact a fully implemented broadcast-flag scheme would have on

[3] In the Matter of Digital Broadcast Copy Protection, Federal Communications Commission Notice of Proposed Rulemaking, at ¶ 9 (Aug. 9, 2002) [hereinafter *NPRM*].
[4] *Id.*

consumers, and the indirect impact it might have by virtue of its effect on other sectors of the economy. Most important, before the Commission considers implementation of a broadcast flag, it should insist upon demonstration of technologies that will function as promised by content companies, protecting content in a robust manner while preserving reasonable and lawful consumer uses of both the content they lawfully acquire and the technologies they own, as well as protecting consumers' privacy expectations.

With regard to the broadcast-flag scheme's direct impact on consumers, the Commission must ask:

> (A) what consumers must reasonably expect to be able to do with digital content, and with their digital tools -- two sets of expectations that may be frustrated if the scheme is implemented.
>
> (B) how lawful uses of copyrighted works reserved to the public in the Copyright Act may be impaired, particularly where such impairment raises First Amendment questions
>
> (C) what additional costs will be imposed on consumers who must buy DTV products that comply with the broadcast-flag scheme (including development, manufacturing and licensing expenses passed on to consumers), and
>
> (D) what confusion and inconvenience a broadcast-flag scheme will cause. This question is especially important because, if differing technologies are accepted under Table (4) the likelihood of interoperability between consumer devices using one protection technology (*e.g.*, DTCP[5]) and those using another protection technology (*e.g.*, OCPS[6]) is small. Consumers have grown to expect a high degree of "plug and play" interoperability among their consumer-electronics devices. This is partly due to the ubiquity of standard analog interfaces, which ultimately also would have to be regulated in order to make a comprehensive broadcast-flag scheme maximally effective.

With regard to indirect impact, the Commission should ask what effect broad regulation of industrial sectors outside its traditional jurisdiction may have upon

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[5] The "Digital Transmission Content Protection" system. *See* http://www.dtla.com; http://www.dtcp.com/data/wp_spec.pdf. The DTCP system has been developed by the "5C" consortium, consisting of Hitachi Ltd., Intel Corporation, Matsushita Electric Industrial Co. Ltd, Sony Corporation, and Toshiba Corporation.

[6] OCPS is the "Open Copy Protection System" proposed by Philips Research. Because OCPS uses a longer encryption key than DTCP and (apparently) different encryption algorithms from those used by DTCP, it is unlikely that an OCPS-enabled device could interoperate with a DTCP-enabled device.

consumers' expectations of rapid development of computer and software products, including the possible regulatory slowing of the creation of new computer markets and industries (which under the broadcast-flag scheme would have to be designed to be compliant with BPDG-robustness and compliance rules).[7]

We have stated these concerns broadly here, but we also note that the Consumer Groups, together with the Center for Democracy and Technology, developed as a response to a request from Chairman Billy Tauzin of the House Energy and Commerce Committee a more detailed analysis and series of questions about the *BPDG Final Report* and recommendations, focusing on possible consumer consequences of implementation.[8] Although we have engaged in an ongoing set of discussions with content companies, information-technology companies, and consumer-electronics companies, we do not believe these questions have yet been adequately answered. We believe the Commission must have adequate answers to these questions before going forward on any proposed implementation of the broadcast flag. We also believe the Commission should consider whether there are overlooked alternative strategies to promoting digital television, including strategies that make use of point-to-point delivery of broadcast content over the Internet.[9]

In response to the Commission's request for information regarding costs to consumers from implementing a broadcast-flag scheme, as well as such a scheme's impact on legacy and new technologies, we observe that there are likely costs that follow from the interoperability and convenience concerns noted in Appendix A. As noted in

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[7] We believe that rapid development and deployment of new products ultimately may be what drives adoption of DTV. These may include products based on home networking, which will offer new utility to broadcast television, as well as products that may help overcome some of the technical deficiencies currently facing over-the-air DTV broadcasting.

[8] *See* Appendix A, *Consumer Policy Questions and Issues Regarding the BPDG Proposal for Protecting DTV Content* (July 10, 2002) [hereinafter *Consumer Policy Questions*], *available at* http://www.publicknowledge.org/documents/graphics-broadcast-flag.html.

[9] *See* Appendix B, Public Knowledge White Paper, *Harry Potter and the Prisoners of the DTV Transition*, (Dec. 6, 2002) [hereinafter PK White Paper], *available at* http://www.publicknowledge.org/reading-room/documents/policy-papers/potter-paper.pdf.

that Appendix, it is unclear that the various technologies approved for inclusion in the BPDG scheme's "Table A" will interoperate with one another or with legacy equipment.[10] We believe this will likely mean less consumer choice and greater cost to consumers as they adapt to digital broadcasting -- not just the cost of DTV receivers, but the costs of equipment designed to interoperate with the receiver and to implement a copy-protection scheme. Should a copy-protection scheme become obsolete, it is unlikely that the successor scheme will be backward-compatible (since if it is it will not close the "hole" created by obsolescence). This means that the obsolescence and the replacement of such a copy protection scheme will lead to a recurrence of those consumer costs.

III. THE ASSUMPTIONS BEHIND THE COMMISSION'S PROPOSED RULEMAKING ARE INCORRECT.

A. There is as Yet No Practical or Theoretical Reason for the Commission to Believe There is (or Soon Will be) an Infringement Problem Uniquely Associated with DTV.

The Commission's request for comments assumes that "digital media, unlike its analog counterpart, is susceptible to piracy because an unlimited number of high quality copies can be made and distributed in violation of copyright laws."[11] This assumption is incorrect, for two reasons:

i. There is no significant degree to which digital content is more infringeable than analog content.

The assumption made by the Commission in the passage quoted, *supra*, can be restated as follows: "Because digital content does not degrade as subsequent digital copies are made from digital copies of the original, this poses a special threat of large scale infringement."

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[10] *See Consumer Policy Questions*, *supra* note 8.
[11] *NPRM* at ¶ 1.

The Commission's assumption is incorrect because the Commission overlooks an important technological consideration -- namely, that digital copies of *analog* content do not degrade in subsequent copying either. It is already the case that digitization of analog TV content *also* leads to high-quality digital copies that do not lead to degradation of quality as subsequent copies are made.

Moreover, high-quality conversion of digital to analog form and from analog content into digital form is trivial and can be done at low cost on a number of inexpensive consumer devices, as well as consumer-grade personal computers.[12] Nor is this conversion limited to NTSC (480i). There is no technical reason that one could not take, for example, DVD-quality (480p) video and convert it to analog form, then redigitize it in a form that would be indistinguishable from the original to almost all viewers. The same is true for higher-quality digital content, such as HDTV.

What has apparently misled the Commission here is that *analog* copies (*e.g.*, analog VHS or audiotape copies) show degradation of quality in subsequent generations (*i.e.*, copying from copies). As audiophiles long have known, this is true even if the analog copy is made from a digital source, such as a music CD; an analog audiotape recording of a music CD will result in degradation of quality and loss of information if subsequent copies are made from the audiotape. Similarly, if someone receives digital cable content and records it through a connected VCR to a VHS tape (which may itself result in a high-quality copy; see next paragraph), and that tape, in turn, is used as a

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[12] *See* the following consumer products *at*
http://www.elgato.com (capturing analog TV and converting to high-quality MPEG digital format);
http://www.formac.com/p_bin/?cid=solutions_converters_studiodvtv (converting analog to digital video);
http://www.projectorexpert.com/Pages/tvcards.html (reviewing cards that capture both ATSC digital TV content and NTSC analog content);
http://www.hauppauge.com (capturing DTV content that can be displayed on an analog computer monitor); and
http://www.digitalconnection.com/Products/Video/hipix.htm (capturing DTV content for display on an analog computer monitor).

source for subsequent VHS tape-to-tape (analog) duplication, the quality of that content will degrade even though it is digital in origin.

While it is true that the conversion of analog content to digital form is theoretically accompanied by some loss of information, it is also true that the loss of any information in a high-quality conversion may be below any level that is perceptible to the ordinary viewer. In effect, with existing consumer electronics and personal-computer equipment, available to and useable by ordinary TV viewers and computer users, digital copying of analog-source content can be just as good, for all practical purposes, as digital copying of digital content.

What this discussion underscores is that, contrary to the NPRM's assumption (widely shared in some policy circles, but generally dismissed by independent technologists) it is not the source (digital or analog) or the original form of the content that makes it susceptible to digital infringement. Instead, it is the irreducible fact that digital devices of all sorts routinely and reliably make perfect copies of digital information, regardless of whether the original source of that information is digital or analog. The ubiquity of digital devices that do this is one of the outgrowths of the microcomputer revolution that began in the mid-1970s.

ii. There is as yet no evidence of an infringement problem associated with the HDTV television content that is already broadcast in the clear or otherwise transmitted in unprotected form.

It has already been established that the major networks are distributing some percentage of their current content in HDTV formats. CBS is already broadcasting most of its primetime schedule and all of its scripted entertainment series, from "Everybody Loves Raymond" to "CSI: Crime Scene Investigation" in the HD format.[13] If digital

[13] *See* "Zenith and Samsung Partner with CBS to Deliver Network's Fourth Season of Primetime HDTV Programming,"Aug. 28, 2002, *available at* http://www.atscforum.org/pr/PR-082802-CBS-Partners.pdf (listing the programs CBS broadcasts in HDTV and discussing their commitment to HD).

infringement of this kind of high-quality digital content were a problem, we should be seeing evidence of that problem even now (*e.g.*, HDTV-quality copies of "Everybody Loves Raymond" appearing on the Internet). Before the Commission proceeds in a rulemaking in this area, we believe there should be some showing of the existence of a significant copyright problem or content-protection problem associated with DTV or HDTV, other than predictions of some future problem.

Whether infringement of HDTV in its original format (rather than a degraded, compressed format showing loss of resolution and loss of other information) will ever be a problem is itself a question that has not been adequately investigated by Congress or by the Commission. As one of the Consumer Groups, Public Knowledge, notes in a White Paper on the DTV transition, the file-sizes of HDTV content in native format are so great that even an individual with the highest-grade consumer broadband connections available today would require many hours or even days to download more than one such file from the Internet.[14]

B. Adoption of the Broadcast-Flag Proposal is Unlikely to Hasten the Transition to Digital Broadcast Television and May Indeed Slow That Transition.

The *NPRM* states the following: "… with a view towards facilitating the DTV transition, this *Notice* seeks comment on whether a regulatory copy protection scheme is needed within the limited sphere of digital broadcast television… If such programming is being withheld, will it continue to be withheld in the absence of a regulatory regime?"[15]

i. There is as yet no commitment by content companies to license HDTV content if the broadcast flag regime or a similar regime is adopted.

An initial question here is whether content providers who have stated a refusal to license content for DTV will commit themselves to release such content if the FCC

[14] *See* PK White Paper, *supra* note 9, at 13.
[15] *NPRM* at ¶ 3.

adopts the broadcast flag proposal. If there is no such binding commitment with specific significant increases over current high-definition and other DTV primetime broadcasts, then it follows there is no guarantee that any agency action taken to require the broadcast-flag-based protection scheme will result in the release of more content or faster consumer adoption of DTV. The absence of such a guarantee would itself be an argument against imposing a broadcast-flag requirement. Moreover, absence of such a commitment raises the question of why there should be any rush to impose such a requirement.

Given the discussion in Sec. III of the mistaken assumption that digital content is peculiarly susceptible to infringement, any content provider's refusal to release digital content for broadcasting may be considered primarily a problem to be solved by educational measures (to correct misunderstandings about the nature of the infringement problem, if any) rather than by technological mandates or other technically focused regulation. Furthermore, the Commission should also ask why some content providers such as CBS have in fact committed to releasing high-quality digital TV programming even in the absence of any settled content-protection scheme for broadcasting.[16]

The Commission also should question the fundamental theory behind this rulemaking proceeding: that the lack of DTV adoption is due to the failure of content providers to offer up HDTV content, which in turn is due to the lack of copy protection. The actual record supports a different theory or set of theories, based on no fewer than five considerations:

- More than half of broadcasting stations are not broadcasting digital television despite the Commission's mandate to do so.[17]
- A number of tests have demonstrated that consumers cannot receive 8VSB-transmission-standard broadcast DTV indoors as reliably as they can receive NTSC (standard television) broadcast signals.[18]

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[16] *See supra* note 13.
[17] *See* Alex Adrianson, *Digital TV: The Future That Isn't Working*, Consumers' Research Magazine, Sept. 1, 2002 (stating nearly three-quarters of the commercial broadcasters missed the May 1, 2002 deadline for being on the air in digital).

- DTV television sets and displays are considerably more expensive than analog sets. A television viewer can buy a good 27-inch color NTSC set for less than $250. By contrast, HDTV-ready television monitors still typically cost more than twice as much, with true HDTV-capable monitors running from about $1500 to more than $3000 without a tuner. Adding a tuner (to make the HDTV monitor a complete "television set") currently costs approximately $400 to $500 (plus, possibly, another $100 to $500 to install an antenna capable of adequately enhancing 8VSB transmissions for reception).
- Most consumers have little if any awareness of the pending transition to DTV.[19]

In practical terms, there is already plenty of DTV content – the 480p digital content of DVDs, which continue to sell exceedingly well.[20] In fact, DVD content is the major force driving the sale of those HDTV-capable displays, including those that contain DTV tuners.

In short, many broadcasters are not yet providing a DTV signal, and when that signal is present viewers have a harder time receiving it. In addition, those viewers who know about the transition and who want to receive DTV must spend larger amounts of money, and cope with less reliable reception.

ii. The Broadcast-Flag Scheme's provision that HDTV content be broadcast "in the clear" neither serves consumers nor adequately prevents infringement.

Even if CBS is an outlier[21], and the general will of content companies is to impose protection on DTV content (or at least on high-quality DTV content), it is unclear why

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[18] *See, e.g.,* E. Taub, *The Big Picture On Digital TV: It's Still Fuzzy*, New York Times, Sept. 12, 2002, G1. "In reception tests from the 64th floor of a New York skyscraper using a rabbit-ears antenna, Mr. Schubin and his colleagues were able to pick up only three of the nine digital stations in the New York area that were then broadcasting." *Id.*

[19] *See* Pelofsky, Jeremy, *Consumers in the Dark on Digital TV*, Reuters, Dec. 3, 2002, *available at* http://digitalmass.boston.com/news/2002/12/03/digital_tv.html (Government Accounting Office survey found that 40% of Americans had never heard of the transition to digital TV, and 43% were only "somewhat aware.").

[20] *See* DVDs Delight Fans and Movie Studios, *at* http://www.msnbc.com/news/842748.asp?0si=-&cp1=1.

[21] It seems unlikely that CBS is an outlier on the question of whether to disseminate its high-value content in unprotected digital formats, given that Discovery Communications Inc. announced in April its June launching of a 24-hour HDTV channel; that ABC is broadcasting a number of popular shows (including The Drew Carey Show, NYPD Blue, Alias, and The Practice) in HDTV already; that NBC has increased its

HDTV needs to be broadcast in the clear. If the nominal purpose of broadcasting high-quality DTV content in the clear is to preserve the benefits of free over-the-air broadcasting, we note (1) that the broadcasting-dependent segment of the television audience is already small and continuing to decline, and (2) that the requirement that this audience buy digital television sets (or digital converter boxes for their analog sets) does much to undermine the policy of promoting "free" broadcasting. Instead, it creates new costs to a consumer demographic that, perhaps, may be less well-positioned to bear that cost (if we assume that some percentage of broadcast-dependent viewers cannot afford cable or satellite service).

We note also that the cost of imposing the broadcast-flag proposal (even if only on the consumer-electronics market) may be more expensive to society as a whole, and to consumers collectively, than would mandating and/or subsidizing satellite dishes for those households that cannot obtain or afford cable or satellite service currently. In addition, the end-to-end scrambling systems of satellite and cable systems do not have the flaws of "marking"-based copy-protection systems like the broadcast-flag proposal.[22]

If, however, the Commission believes (and, more importantly, develops an empirical record demonstrating) that the lack of HDTV content is slowing the DTV transition, then the Commission could require that content providers provide an increasing amount of HD primetime TV content each year (*e.g.*, 50% in 2003, 75% in 2004, and 100-% in 2005). If the concern is to maintain the viability of over-the-air television broadcasting, wouldn't it be less a less costly solution if the Commission simply required producers and distributors of TV content to produce broadcast content in HDTV format, just as CBS does now, especially if the evidence for any infringement threat associated with DTV is less serious than has been asserted?

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broadcasting of HDTV content from 6 hours to 14 hours just this year; and that Fox is broadcasting 100 percent of its primetime programming in Enhanced Definition 480p format (i.e., DVD quality).

[22] *See infra* Subsection (3) (discussing the flaws marking-based copy-protection).

iii. A regulatory copy protection scheme serves neither consumers nor content providers, and could slow the transition to DTV.

As we discussed in Sec. III A, the express concerns about DTV content infringement may be overstated. Apart from this issue, it is unclear whether "a regulatory copy protection regime" is the best answer, both in terms of preserving consumer expectations as to access to, and use of, commercial content and in terms of adequately protecting the interests of those who create, produce, and distribute commercial content. History suggests that copy-protection technologies, once deemed more than adequate, may ultimately prove to be flawed. We take the position that a relatively unregulated market in information-technology and consumer-electronics products and services is more likely to be responsive when it comes to protecting commercial content against future technological attacks. What the Commission may do, if it proceeds too quickly to adopt a broadcast-flag scheme, is "set in stone" what kinds of technological responses these industries, as well as the content industry, may develop in response to new technological attacks. This we believe will serve neither consumers nor content owners. Indeed, by imposing a regulatory process over the development of new copy-protection technologies, the Commission may itself slow the transition to digital television, especially if unforeseen problems relating to the protection of digital content arise.

C. The Scope of the Broadcast-Flag Proposal, and the Technical Hurdles and Outstanding Effectiveness and Consumer Issues Surrounding it, Mean that the Commission Should not Yet Adopt Rules That Would Impose This or Any Similar Proposal.

The Commission asks for comment on whether it "should adopt rules or create some other mechanism to resolve outstanding compliance, robustness, and enforcement issues."[23]

The NPRM correctly characterizes the BPDG negotiations as having been "unable to reach a consensus, including enforcement mechanisms" on compliance and robustness

[23] *NPRM* at ¶ 4.

requirements regarding the broadcast-flag. What it does not do is characterize the causes for the lack of consensus, which include fundamental disagreements about the question of whether the broadcast-flag scheme is the best approach for protecting digital content, whether it works adequately, and whether consumers will be unduly inconvenienced by its implementation.

One disagreement concerned the decision to use a "broadcast-flag" approach rather than to use encryption or scrambling to protect broadcast HDTV content (as is currently the approach for cable and satellite distribution). Consider for example Footnote 3 of the *BPDG Final Report*, which notes that some companies argued for end-to-end encryption protection of content as technically superior, but were told that for "political" and "economic" reasons an encryption-based approach to protecting HDTV content would be nonviable. What Footnote 3 suggests is that many of the fundamental differences stem from the fact that the broadcast-flag scheme is perceived by the information-technology companies, by independent technologists, and even by some content creators and distributors as inherently flawed or, at best, "incomplete".[24] While no copy protection system is "unhackable," transmitting the information in the clear, on the assumption that content protection will begin at demodulation of the broadcast signal, results in a system that, in effect, "leaves the front door open."

To take only one example: It is generally known that the latest Intel microprocessors run at speeds of up to 3.06 GHz; Moore's Law[25] predicts the arrival of 6.12 GHz microprocessors within 18 months. Even if such microprocessors do not arrive on schedule, it is certain that increasingly popular dual- and multi-processor personal computers based on high-speed microprocessors could support software-based demodulation of an "in the clear" digital television signal in the near future (the PC

[24] *See* Comments of The National Music Publishers' Association, MB Docket No. 02-230, 8-10 (Oct. 30, 2002).
[25] *See* Moores' Law Definition, *at* http://www.webopedia.com/TERM/M/Moores_Law.html.

would essentially require little more than an antenna and a generic analog-digital converter). For this and other reasons, regulating PC design seems to be necessary under the broadcast-flag scheme (as the National Music Publishers correctly note in their filing[26]).

This example explains in part why it is generally believed among technologists that copy protection schemes based on "marking" or "flagging" the content to be protected essentially require that all digital devices capable of transmitting digital data be redesigned to monitor for marked content and then limit copying and/or transmission accordingly. Furthermore, although technologists generally believe a "marking" scheme is inherently less effective than end-to-end encryption, they also recognize that the only regime under which a "marking" scheme might work to the required degree is one in which most or all digital devices (including software) are brought under the regulation. Such regulation would reach beyond traditional consumer-electronics devices--mostly players and recorders--to general-purpose information-processing tools such as computers and software, once again arguably raising jurisdictional problems for the Commission. [27]

Another source of disagreement in the BPDG proceedings was the recognition by some attendees that the broadcast-flag proposal would likely be ineffective, even if imposed in as broad-ranging a form we discuss in the preceding paragraph, because of the "legacy" DTVs in the field.[28] They knew, for example, that although there are fewer than 250,000 DTV receivers in households today, if the proposal is implemented – assuming that the 8VSB standard is improved to carry ATSC reliably — there will likely

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[26] *See* Comments of The National Music Publishers' Association, *supra* note 24, 10-11.
[27] As we shall discuss below in Sec. V, imposing a broadcast-flag standard on a broad range of technologies also would seem to be beyond Commission jurisdiction as that jurisdiction is currently understood.
[28] *See Consumer Policy Questions*, *supra* note 8.

be a million or more unprotected receivers with "in the clear" digital outputs that can be interfaced to existing equipment for duplication and retransmission through the Internet.

In addition, many information-technology companies and consumer-electronics companies recognized that digital-analog-digital copies from a DTV source are likely to be perceived to be as good as the original to ordinary viewers, even on a high-quality display device.[29] Thus, they disagreed on implementing the BPDG scheme because the scheme, in effect, also "leaves the back door" open, since digital-analog-digital copies would sidestep broadcast-flag-based copy protection. The disagreement about the broadcast-flag proposal reflects a recognition that, without analog protection, the BPDG approach is ineffective, and that, furthermore, there has been no generally accepted satisfactory solution to the problem of the so-called "analog hole" (which may not be solvable at all). Watermarking technologies, the only widely known proposed solution to the "analog hole," have not been publicly demonstrated to work effectively, and there are also theoretical reasons to believe they simply cannot work as indelible marks for digital content.[30]

It should be noted here in passing that one proposal to ease the transition to DTV for consumers has been the notion of relatively inexpensive "converter boxes" that would adapt legacy analog TV sets to receive digital signals. One side effect of this measure could be to *widen* the "analog hole" by enabling existing analog home-entertainment equipment to demodulate high-quality DTV content, convert it to analog form through the converter box, and then retransmit it, absent a broadcast flag, to another device, where it can be redigitized and transmitted to the Internet or elsewhere. If we assume that the content companies are correct to say that infringement of digital television content will

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[29] *See supra* Sec. III (discussing digital and analog content infringeability).

[30] *See* Scott A. Craver, et. al., *Reading Between the Lines: Lessons from the SDMI Challenge*, Proc. of 10th USENIX Security Symposium, Aug. 2001. *See also* Darko Kirovski & Fabien A.P. Petitcolas, *Replacement Attack on Arbitrary Watermarking Systems*, ACM Workshop on Digital Rights Management, (2002) *at* http://crypto.stanford.edu/DRM2002/drm.pdf.

prevent them from licensing content for HDTV broadcasts, we observe that converter boxes will exacerbate this alleged problem, and thus give content companies further disincentives to license their content. This eventuality would not only fail to accelerate the transition to DTV, but also would seem to slow it.

Yet another reason some industry representatives could not agree on the compliance and robustness rules is that they were concerned that the functional requirements of the rules might significantly limit what consumers can do with commercial TV content, constraining TV viewers far more in the future than they have been in the last two decades -- by, for example, making it impossible for someone to record a TV show at home and then take the recording to work to play it on a different device.[31]

It seems likely that, if the Commission were to take on the task of setting and enforcing the compliance and robustness requirements of the BPDG broadcast-flag scheme as broadly as necessary to make the scheme maximally effective, it would find itself mired both in technical issues and consumer issues that extend far beyond the traditional domain of regulating television broadcasting. Answering the questions raised by these issues seems likely in itself to cause delays in the transition to DTV.

Because the issues surrounding implementation of a broadcast-flag scheme involve an inextricable mix of technical and policy questions -- inextricable because nearly every technical decision in this arena has effective policy consequences, and because nearly every policy choice in this arena has far-reaching technical consequences -- we believe that the determination of the need for such a regime, as well as the

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[31] *See Individual Comments of the Consumer Electronics Industry Co-chair, BPDG Final Report, supra* note 2, Sec. 2.21. "Some CE companies are concerned that while the initially understood goal was to protect retransmission of content over the internet, the actual document is less than clear in specifically narrowing this protection to the public network known as the Internet, and that while exclusions have been made for home and personal networks, these limits are not clear." *Id.* The co-chair's comments list a number of other consumer-based concerns as well. *See id.*

determination of its scope and particulars, should be derived from clear statement of policy direction from Congress, and should be delayed until it has spoken on the matter.

The policy questions we believe Congress is best positioned to determine include but are not limited to reasonable consumer expectations regarding personal copying, time-shifting, pace-shifting and the preservation of the freedom to make lawful uses of digital technology and content. They also include questions of whether consumer expectations regarding consumer-electronics and information-technology devices and software will continue to be met. Currently, consumers expect to be able to disassemble, study, and modify these devices -- it is unclear how these expectations would apply to devices and software that, per regulatory requirement, met the robustness and compliance rules necessary for effective broadcast flag implementation. It is further unclear whether the rules would have an impact on both individual and industrial innovation.[32] To date, no Congressional hearings have been held focusing on these particular questions as they relate to implementation of large-scale copy-protection schemes.

IV. ANSWERS TO SPECIFIC QUESTIONS IN THE NPRM

A. "Would a regulatory copy protection regime create and maintain industry incentives to continually innovate to improve the method of digital content protection?"[33]

Because under a Commission-instituted Rule, the adoption of any improved or alternative content-protection technology would require approval by the Commission or some appropriately delegated body or agency, that approval process alone would slow the introduction of better technologies to market.

In addition, the effort focused on "marking" approaches to protection of content would absorb industry research-and-development resources and funding that might be

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[32] *See* Mike Godwin, *Free to Tinker? IP Caution Could Undermine the Great American Urge to Innovate*, Legal Times, Oct. 21, 2002.
[33] *NPRM* at ¶ 4.

better focused on point-to-point secure delivery systems. This creates an opportunity-cost problem, and also is problematic because content-protection experts generally agree that point-to-point security is inherently more reliable than a scheme in which content is broadcast in the clear and secured only at the point of demodulation.

B. "… we seek comment on whether broadcasters and content providers should be required to embed the ATSC flag or another type of content control mark within digital broadcast programming, or whether they have sufficient incentive to protect such programming such that a government mandate is unnecessary."[34]

Since the broadcast flag would be part of the ATSC standard, any broadcaster who engages in digital broadcasting will be using ATSC-compliant broadcasting equipment and would automatically transmit the flag. Ergo, there is no need for broadcast-flag-specific mandate.

There is also the issue here, however, that the Commission must decide when the broadcast flag may not be used. For example, certain programs should not be protected by the flag, such as news (including public events such as State of the Union, Presidential Press Conferences, Congressional and agency proceedings, and similar events).

A broader point to be considered here is that the broadcast flag, if present in the ATSC signal, represents the broadcaster's desire not to have the content copied. But some broadcasters might choose not to use the broadcast flag, because they are happy to allow copying (*e.g.*, because their business model, even after one accounts for licensing restrictions imposed by content companies, allows for some consumer copying of commercial content). A broadcast-flag mandate would prohibit broadcasters from making the choice to explore alternative business models that allow consumer copying.

As for "another type of content control mark within digital broadcast programming," we note with concern that some advocates of the broadcast flag appear to

[34] *NPRM* at ¶ 5.

envision a "next step" of control over uses of content, including perhaps lawful uses, by including a larger flag payload than necessary at this juncture. The broadcast flag proposed by the BPDG contains an "rc-information field" defined as an undesignated segment of the broadcast flag reserved for "optional additional redistribution control information that may be defined in the future." We urge the Commission to give careful consideration to whether any proposed solutions could be used for other unintended purposes that might not be beneficial to the public.

C. "On the reception side, we seek comment on whether the Commission should mandate that consumer electronics devices recognize and give effect to the ATSC flag or another type of content control mark. If so, we seek comment on whether this mandate should include devices other than DTV broadcast receivers and what the resulting impact would be on consumers…"[35]

Certainly, in order for any marking scheme to have a hope of being effective, broad regulation of some sort over reception and recording devices would be required. This could, however, disrupt the convergence of traditional consumer electronics and more flexible computer and software devices.[36] One benefit of this convergence has been lower-cost consumer devices; another has been development of new products. Consumers already expect consumer products such as DVD players and CD writers to drop in cost over time, and they also expect new products and increasing functionality of existing product lines.

If we assume that a "marking"/monitoring scheme is not implemented industry-wide, it might lead to bifurcation of CE and information-technology sectors, in effect ending convergence and its resulting benefits to consumers in terms of less expensive and new products. This might also lead to fragmentation within the consumer-electronics and information-technology sectors, as manufacturers divide product lines into (1)

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[35] *NPRM* at ¶ 6.
[36] TiVo and ReplayTV, which take advantage of increasingly inexpensive computer components, are modifiable -- we may predict future versions of these products will be developed for digital TV.

"compliant" and "robust" consumer devices that are more limited in functionality, and (2) so-called "professional"-grade devices, which are not constrained by broadcast-flag design requirements.[37] (The word "professional" is something of a misnomer here, since professionals and nonprofessionals alike routinely purchase, and continue to express demand for, general-purpose computers, which of course are the source of most unlicensed content distributed today on the Internet, and which routinely are modified or programmed for special-purpose, "professional" functions). Not only would the drawing of these lines reduce the cost benefits of convergence due to economies of scale, but they also would undercut innovation, since tomorrow's engineers and programmers typically learn their skills as much from exploring general-purpose home computers and from being able to disassemble, explore, and modify consumer-electronics devices as they do from any institution-based education.

In short, if the Commission commits itself to determining the proper solution for protection of digital television, and does so without adequately considering both the "downstream" requirements and the "downstream" effects of such a scheme, it may succeed only in (a) putting the brakes on the digital content revolution and on the computer revolution generally, and (b) adding costs to DTV equipment, which is already comparatively expensive. Neither of these developments would benefit consumers or accelerate the transition to digital television.

[37] *See BPDG Final Report, supra* note 2, Sec. 4.12. "Both proposals for section X.2 of the Compliance and Robustness Requirements anticipate that an appropriate provision will be crafted so as to exempt the requirements from applying to products that are specifically intended for professional and broadcast use (*e.g.,* equipment used by studios, TV broadcasters, satellite and cable operators)." *Id.*

D. "We seek comment on how a particular technology would receive approval for use in consumer electronics devices for digital broadcast copy protection purposes. We also seek comment on identifying the appropriate entity to make an approval determination."[38]

We find it difficult to imagine any approval scheme for Table A inclusion that does not simultaneously suppress innovation for established corporate technology developers (who will design for regulatory approval rather than for efficiency, interoperability, or maximum security) and lock GNU/Linux and other open-source developers [39] as well as individual and small-firm developers for proprietary platforms such as Microsoft Windows (or in any other case in which there is no established corporate infrastructure to pursue regulatory approval).[40] Even now, the development of new digital technologies or new digital applications of existing technologies is dependent more on small-scale and individual innovators than is innovation in other industrial sectors. The regulatory scheme discussed here has the potential skewing of the market and technological development in both predictable and unpredictable ways.

If, however, the Commission does proceed to develop a system for approving technologies for inclusion in Table A, that system should be based on objective criteria, with public notice and comment, and with due protection of legitimate consumer interests.

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[38] *NPRM* at ¶ 7.

[39] GNU/Linux, sometimes referred to popularly simply as "Linux," is a computer operating system whose source code, as well as the source code for many of its applications, is widely published and generally distributed with, or in place of, its binary form. Developers who wish to draw upon the existing base of GNU/Linux source code are obligated by licensing agreements to publish the source code of whatever software tools and applications they develop for public distribution, so that end users can inspect and modify it as necessary. GNU/Linux and other so-called "open source" operating systems continue to provide a lively base of software development in the United States and around the world, primarily due to the multitude of individual programmers who use the GNU/Linux base of source code and add to it. Because the source code is generally public, however, any attempt to implement GNU/Linux tools to interoperate with the digital television protection scheme outlined by the BPDG is unlikely to meet the "robustness and compliance" requirements laid out by the BPDG report. Indeed, published source code makes GNU/Linux tools inherently "tamperable."

[40] While individual programmers and developers for the Windows operating system may not be constrained by the licensing agreements that bind open-source developers, they are less likely than large corporations to have the resources both to develop new technologies that interoperate with the BPDG-scheme technologies and to pursue Commission approval of those technologies.

E. "[W]e seek comment on whether there are First Amendment or any other constitutional issues that we should consider from the point of view of the industries involved or individual consumers."[41]

With regard to the First Amendment implications of the broadcast flag and similar approaches, traditionally, fair use has been held to be a way of harmonizing copyright-law restrictions on expression and First Amendment freedom of expression.[42] To the extent that a broadcast-flag proposal might curtail fair use, it undercuts First Amendment values.

There are other First Amendment-related constitutional values besides those encompassed by fair-use doctrine in our copyright law. Notably, freedom of inquiry may be affected by restrictions on use and/or modification of consumer electronics and computer technologies.[43] Moreover, since our courts have established that writing a computer program constitutes protected expression under the First Amendment,[44] any scheme that restricts the kinds of software that individuals and corporations can author will necessarily have a First Amendment impact.

V. THE COMMISSION LACKS JURISDICTION TO MANDATE THAT CONSUMER ELECTRONICS DEVICES RECOGNIZE AND OBEY A BROADCAST-FLAG

The Commission seeks comment on the limits of its authority to implement a digital copy protection scheme, and specifically requests comment as to whether it has the "authority to mandate the recognition of the ATSC flag in consumer electronics devices."[45] The Commission also asks "whether Sections 336(b)(4) and (b)(5) impact upon the Commission's ability to adopt digital broadcast copy protection regulations?" [46]

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[41] *NPRM* at ¶ 8.
[42] *See, e.g.*, Nihon Keizai Shimbun, Inc. v. Comline Business Data, Inc., 166 F.3d 65, 74 (2d Cir. 1999) (stating that the Second Circuit has "repeatedly rejected First Amendment challenges to injunctions from copyright infringement on the ground that First Amendment concerns are protected by and coextensive with the fair use doctrine").
[43] *See* Godwin, *supra* note 31.
[44] *Bernstein v. U.S. Dept. of Justice*, 176 F.3d 1132 (9th Cir. 1999).
[45] *NPRM* at ¶10.
[46] *Id.*

As discussed below, while the Commission may have the authority under the Communications Act to require that a broadcast flag be made part of the DTV signal, it does not have the authority under the Communications Act to require consumer electronics and/or computer manufacturers to architect their hardware to obey it. Moreover, there is nothing in Section 336 that gives the Commission that authority.

A. The Commission Does Not Have Ancillary Jurisdiction to Require Consumer Electronics Devices and/or Computers to Obey a Broadcast Flag.

While the Commission has broad authority to regulate all forms of electrical communication, including broadcasting, under Title I of the Communications Act, such authority is "not without limits."[47] The FCC's ancillary authority under Title I only supports regulation where the Commission has subject matter jurisdiction over the communications at issue and the regulation is reasonably required for the FCC to administer an explicit statutory obligation.[48]

Under these parameters, it is clear that while the Commission likely has the authority to require some sort of broadcast flag be imbedded in a DTV signal, it does not also have the authority to require consumer electronics devices and/or computers to obey the flag or other digital copy protection mechanism the Commission might require. As discussed below, nothing in Section 336 gives the Commission that authority. And to the extent that the Commission is tasked under the Communications Act to provide a "fair, efficient, and equitable distribution" of broadcast service among the "several States and communities,"[49] and to act "as it may deem necessary" to prevent interference among

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[47] *MPAA v. FCC*, 309 F.3d 796, 804 (D.C. Cir. 2002)
[48] *See United States v. Midwest Video Corp*., 406 U.S. 649 (1972) (plurality opinion); *United States v. Southwestern Cable Co*., 392 U.S. 157, 178 (1968); *MPAA v. FCC*, 309 F.3d at 806-7.
[49] 47 USC §307(b)

stations,[50] implementation of a broadcast flag scheme will do nothing to further those statutory goals.[51]

Moreover, Title I itself does not bestow "plenary authority over 'any and all enterprises which happen to be connected with one of the many aspects of communications.'"[52] Title I does grant the Commission authority over "all interstate and foreign communication by wire or radio," which includes broadcasting.[53] "Radio communication" is defined as "the transmission by radio of writing, signs, signals, pictures, and sounds of all kinds, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding and delivery of communications) incidental to such transmission." [54]

Obeying a broadcast flag is neither the transmission of a signal nor a service "incidental" to such transmission. Instead, it is a process that occurs after the transmission and reception of a signal. Similarly, the recording functions of consumer electronics equipment have nothing to do with the transmission of a signal, nor are they incidental to that transmission. Even if the Commission were to construe obeying a broadcast flag as part of the reception of a signal, it would be insufficient to give the Commission jurisdiction over hardware devices. As the Commission has stated "[w]hile it might be argued that receiving facilities are incidental to radio transmission, the full extension of that argument would be unreasonable because it would require that all television and radio receivers be licensed as well as receive-only earth stations."[55]

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[50] 47 USC §§303(f)(h).
[51] It was based on these statutory obligations that the Supreme Court in *United States v. Southwestern Cable* determined that the FCC had ancillary jurisdiction over cable television. 392 U.S. at 173-174.
[52] *United States v. Southwestern Cable Co,* 392 U.S. at 164 (quoting CATV and TV Repeater Services, 26 FCC 403 (1959)).
[53] 47 USC§ 152(a).
[54] 47 USC §153(33).
[55] *Regulation of Domestic Receive-Only Satellite Earth Stations*, 74 FCC2d 205, 217-18 (1979) (explaining that because receive-only earth stations do not transmit, they are subject only to voluntary licensing under the FCC's ancillary authority over spectrum so that such receivers can obtain protection from interference.)

To the extent that the Commission has regulated consumer electronics devices in the past, it has done so only under explicit statutory authority. For example, the FCC required television sets to receive all UHF and VHF channels pursuant to the 1962 All Channel Receiver Act.[56] The Commission regulated closed-captioning pursuant to the 1990 Television Decoder Circuitry Act.[57] Most recently, the Commission promulgated regulations requiring television sets to include a V-Chip pursuant to Section 551 of the Telecommunications Act of 1996.[58] Not only is such an explicit mandate absent here, there is disagreement both by key members of Congress and the FCC as to the Commission's authority to require consumer electronics and computer hardware to obey copy protection mechanisms.[59] Draft legislation circulated by the House Energy and Commerce Committee that would provide such a mandate has only added to the debate.[60]

B. 47 USC Section 336 Does Not Give the Commission Authority to Require Consumer Electronics Devices and/or Computers to Obey a Broadcast Flag.

Nothing in the plain language or legislative history of Section 336[61] supports the notion that it vests the Commission with jurisdiction over consumer electronics devices and/or computers. The Commission specifies two provisions in Section 336 –

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[56] Pub. L. 87-529, 76 Stat. 150 (codified at 47 U.S.C. §§303(s), 330(a)).
[57] Pub. L. No. 101—431, 104 Stat. 960 (1990) (codified at 47 USC §§303(u), 330(b)).
[58] Pub. L. No. 104-104, sec. 551, 110 Stat. 56, 139-42 (1996) (codified at 47 USC §§303(x), 330(c)).
[59] *Compare* Letter from Senate and House Judiciary Committee Chairmen Leahy and Sensenbrenner to FCC Chairman Powell (Sept. 9, 2002) *with* Letter from Senate Commerce, Science and Transportation Committee Chairman Hollings to FCC Chairman Powell (July 19, 2002) *and* Letter from House Energy and Commerce Committee Chairman Tauzin and Ranking Member Dingell to FCC Chairman Powell (dated July 19, 2002). *See* Testimony of FCC Chairman Michael K. Powell, Agenda and Plans for Reform of the FCC: Hearing Before the Telecomm. and Internet Subcomm. of the House Energy and Commerce Comm., 107th Cong. 37-38 (2001) (stating that "there are issues about copyright and intellectual property protections …. [M]ost of those issues are outside the specific jurisdictional context of the Commission"); NPRM, Concurring Statement of Commissioner Copps (noting that "there is not a majority here to resolve the issue of the Commission's authority").
[60] A copy of the staff discussion draft and the section-by-section explanation is *available at* http://energycommerce.house.gov/107/drafts/dtvstaff.htm.
[61] 47 USC §336.

subsections (b)(4) and (b)(5).[62] But as discussed below, neither confers authority on the Commission.

The plain language of Section 336(b)[63] confirms this interpretation. Under Section 336(b), any regulations the Commission adopts pursuant to Sections 336(b)(4) and (b)(5) must be limited to those necessary for "*prescribing the regulations required by subsection (a).*"[64] Section 336(a)[65] requires the Commission, when issuing DTV licenses, to

> 1) …limit the initial eligibility for such licenses to persons that, as of the date of such issuance, are licensed to operate a television broadcast station or hold a permit to construct such a station…and
>
> 2) …adopt regulations that allow the holders of such licenses to offer such ancillary and supplementary services on designated frequencies as may be consistent with the public interest, convenience and necessity.

Thus, whatever rules the Commission adopts under Section 336(b) have to further Commission regulations governing either initial DTV licensing or the provision of "ancillary and supplementary services," which is defined as those

> A) for which payment of a subscription fee is required in order to receive such services, or
>
> B) for which the licensee directly or indirectly receives compensation from a third party in return for transmitting material furnished by such third party.

47 USC §336(e). The Commission's rules plainly state that "any video broadcast signal provided at no direct charge to viewers shall not be considered ancillary or supplementary."[66]

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[62] 47 USC §§336(b)(4) and (5).
[63] 47 USC§336(b).
[64] *Id*.
[65] 47 USC§336(a).
[66] 47 CFR §73.624(c).

Thus, while Section 336(b)(4) requires the Commission to "adopt such technical and other requirements as may be necessary or appropriate to assure the quality of the signal used to provide advanced television services, and may adopt regulations that stipulate the minimum number of hours per day that such signal must be transmitted," any technical regulation adopted under that Section must somehow be tied to DTV licensing or the ability of licensees to provide ancillary and supplementary services.[67] The same is true for Section 336(b)(5), which requires the Commission to "prescribe such other regulations as may be necessary for the protection of the public interest, convenience and necessity." The Commission confirmed this reading of Section 336 in its 1998 decision that set fees for ancillary and supplementary DTV services.[68]

In sum, neither Section 336(b)(4) nor (b)(5) can confer jurisdiction on the Commission to require consumer electronics devices to obey a broadcast flag because the flag is unrelated to initial DTV licensing, and, because the flag is intended only for the copyright protection of free, over-the-air video broadcasting, it is unrelated to the provision of ancillary and supplementary services.

VI. CONCLUSION

The Consumer Groups stress again that we support the policies behind the Copyright Act and the protection of copyrighted works, on the principle that the law of copyright ultimately leads to greater consumer choice of, and access to, creative works. In addition, we make explicit here that we do not oppose digital-rights-management technologies, including even a "marking"-based technology if necessary, so long as such technologies are consistent with reasonable consumer expectations and do not extend the scope of copyrights beyond the limits imposed in the Copyright Act. We are concerned

[67] Thus, it is not even necessary to confront the question of whether requiring a broadcast flag has anything to do with the *quality* of a DTV signal. Clearly, it does not.
[68] *Fees for Ancillary or Supplementary Use of Digital Television Spectrum,* FCC No. 98-303 (November 19, 1998) at ¶2.

here, however, not with the general issue of copyright protection, but with the question of whether it is prudent for the Commission to proceed to attempt to erect a regulatory framework aimed at protecting digital-television content (but that, of necessity, must reach beyond the range of devices over which the Commission heretofore has been determined to have jurisdiction) in the absence of evidence that such a proposal will be effective, and in the absence of evidence that the particular problem identified by some content companies will ever occur, especially since doing so poses grave risks of economic and noneconomic costs to consumers. The Commission does not yet have either the authority or the factual record necessary to support proposed rules in this docket.

Gigi B. Sohn
John T. Mitchell
Public Knowledge
1875 Connecticut Avenue, NW
Washington, DC 20009
(202) 518-0020

Christopher Murray
Consumers Union
1666 Connecticut Avenue, NW
(202) 462-6262
Washington, DC 20009

Counsel for Public Knowledge and Consumers Union

Nathan Mitchler, Law Clerk
Public Knowledge

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APPENDIX A

Consumer Policy Questions and Issues Regarding the BPDG Proposal for Protecting DTV Content

Date: **July 10, 2002**

To: **House Commerce Committee Staff**

From: **Center for Democracy and Technology, Consumers Union, and Public Knowledge**

Re: **Consumer Policy Questions and Issues Regarding the BPDG Proposal for Protecting DTV Content**

We have been asked by Committee staff to provide a preliminary analysis from a consumer perspective of the Broadcast Protection Discussion Group's (BPDG) Final Report on the protection of digital television. We also have been asked to suggest questions that the Committee should consider with regard to the broadcast-flag standard and related legislation and/or regulation.

Introduction

We support the goal of promoting DTV[1] and recognize that the resolution of certain copyright issues could be important to achieving that goal. Further, we are committed to the protection of copyright, and we support creators' and publishers' prerogative to protect their copyright interests through technical means. Consumers have valid interests in this issue as well — in rewarding artists to ensure the availability of a rich variety of content, and also in the cost and convenience of new DTV technology and its impact on other media, like the Internet.

From a consumer perspective, key issues posed by the broadcast-flag proposal include —

- *How will the proposed solution affect consumers*? Will they have to buy substantial new equipment? Will they be able to exercise the fair use rights they have reasonably come to expect?

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1 "DTV" can be a confusing term, since "digital television" can mean anything from current digital delivery systems (e.g., satellite and cable digital transmission) to high-definition television schemes ("HDTV") to implementation of digital-transmission technologies as a way of using broadcasting spectrum more efficiently, resulting in higher-quality broadcasts. We take "DTV" as used in the context of the broadcast-flag discussion to refer primarily to HDTV and secondarily to any digital "high-quality" television content.

- *Are there downstream impacts on other computing technologies*? For example, will the BPDG's restrictions have a negative impact on innovation and the growth of the Internet? Will it set a precedent for broader government standard setting?
- *Will it be effective*? Will the proposal sufficiently diminish the copyright infringement at issue, or will additional steps be needed? Can it be implemented fast enough to promote greater DTV adoption?
- *What are the costs for consumers*? How much will implementing the BPDG proposal add to the economic and convenience costs of DTV and of other consumer technologies?
- *Do the likely benefits of the proposal outweigh the likely costs?*

In general, we believe that serious questions remain as to whether the broadcast flag proposal will be sufficiently effective. Congress should seek assurance that it will not have adverse consequences on consumers, including their ability to use their existing products, their ability to exercise legal and reasonably expected fair uses of content, and their access to future innovative technologies that might allow them to manipulate content in creative ways that are legal under copyright law.

Broader dialog is in order. The Committee should seek more information and use its standing to promote a fuller exploration of the consumer implications of implementing a broadcast flag, and to ensure protections for consumers in any legislative or regulatory endorsement of a solution like the broadcast flag. We believe that all sides in the debate would benefit from developing much clearer answers to these questions. We are eager to work with you, your staff, and the affected stakeholders to ensure greater involvement of the consumer perspective in these important deliberations.

I. Consumer Impact Analysis

The BPDG Final Report represents the deliberations of a group that was expressly limited in its mission, which was to "evaluat[e] **technical** solutions for preventing unauthorized redistribution"[2] of digital TV content (emphasis added). By intention, the Report did not seek to present a comprehensive means of controlling copying and transmittal of DTV content. By and large, we think that is a good thing — Congress should be highly skeptical about comprehensive solutions, and prefer incremental approaches undertaken by the private sector.

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2 See Final Report of the Co-Chairs of the Broadcast Protection Discussion Subgroup to the Copy Protection Technical Working Group (hereafter "the Report") at Sec. 0.1.

Over time, however, as other technical and policy issues are dealt with, a broader consideration of consumer concerns will be needed, and this process must include consumer organizations as well as industry. Such a broader assessment of consumer impact would:

- Address the question of impact on **legitimate consumer uses** and **compatibility** of the proposal with home entertainment and computer equipement that consumers have already bought and will want to buy.
- Consider the **impact on innovation and on computing technologies**, and particularly whether a precedent is being set for government involvement in setting standards.
- Estimate the **cost** to consumers and other users of the new devices that may incorporate this standard.
- Fairly appraise the **effectiveness** of such a standard.
- Identify **alternatives** that may serve copyright and consumer interests.

As we recommend below, the Committee is now in a position to encourage broader dialog with consumer groups and other stakeholders about these impacts.

II. Compatibility, Consumer Inconvenience and Fair Use

The Report does not fully address the potential inconvenience and disappointment that implementation could visit upon consumers. In fairness, it would have been difficult for the Report as conceived to discuss fair use in detail. A copyright protection system should not deprive consumers of the ordinary, commonly accepted uses of their current products. People should not be expected to be required to go out and buy new products in order to conduct the legal activities they are currently able to conduct. And such a system should not limit innovation, especially innovation in rapidly evolving technologies such as the Internet.

- For example, if the proposal were implemented, could the Chairman record a show over the weekend at home and ask a staffer to watch it on Monday at work? Could the Chairman's staff record a DTV news show on which the Chairman appeared and send it electronically to the Chairman's district office, so he could watch it there? Could the staffer burn a news program onto a CD and give it to the Chairman to watch on his laptop computer in an airport?

- Today, a consumer can record a DTV show with her DTV-equipped computer on a recordable DVD, then watch it at night in her bedroom on a popular DVD player purchased years ago. She could also bring it to the home of a friend or family member and watch the show there. Will these instances of "fair use" be curtailed under the BPDG proposal?
- Is legacy equipment protected? That is, will consumers be able to get full use of their old TVs and VCRs? Will enforcement of the Requirements Document limit consumers' use of equipment they already own?
- To what extent will compliance with the Report conflict with reasonable consumer expectations about fair use, such as the ability to time-shift, play a recording on multiple devices, play a recording on device either inside the home or outside the home, etc?

In terms of future equipment, although a variety of different Authorized Technologies for output and recording would be permitted under the Requirements Document, it is not clear how they would interoperate. Issues that need clarification include:

- How will devices with different Authorized Technologies interoperate, *e.g.*, a DTCP-equipped DTV set-top receiver and an OCPS recorder? (*See* proposed Authorized Technologies.)[3]
- Will there be converters between different Authorized Technologies and, if so, what will they cost?

Congress ought to have a clear understanding of whether existing devices owned by consumers will work under the proposal, whether reasonable expected fair uses will be allowed, and whether technologies will interoperate. Overall, how much work needs to be done to understand how consumers will be educated as to these new requirements when, throughout the history of commercial television, interoperability and integration of television systems has been relatively seamless?[4]

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[3] Under the Requirements document, the only permitted digital outputs and recording technologies are those that the "enforcement body" (possibly the FCC) places on Table A. DTPC and OCPS are two mutually incompatible protection technologies proposed for inclusion on Table A. If both technologies are ultimately included in Table A, this raises the prospect of interoperability problems. These problems would only multiply as additional incompatible technologies were approved for Table A.

[4] We note that the FCC, one of the possible enforcement bodies for the proposed broadcast-flag scheme, historically has been concerned with promoting ease of use and

III. Impacts on Other Technologies

In order to fully protect DTV content across a range of future platforms, the BPDG plan necessarily impacts a broad variety of devices that might someday receive and distribute DTV broadcasts. Importantly, these include general-purpose computers and the Internet.

For example, a PC today could receive DTV signals and store them on its hard drive for playing, manipulation, and redistribution. Under the BPDG plan, computers would have to guarantee that such files were treated differently from the other files a user creates.

- What impact will implementation of the Report have on general-purpose computers? Will compliance require substantial changes to computing architecture, or diminish future innovation in technologies not contemplated in the BPDG model?
- What impact would compliance have on open source systems?
- Will the report set a precedent for government mandates of security standards with broad applicability, and with ramifications for future Internet development? The Internet's growth and development took place with relatively few government constraints — especially technical constraints. The result of that policy choice has been unexpected growth in applications of the Internet, including the World Wide Web, and rapid adoption of Internet technologies and applications by the public.

The Committee ought to have a clear understanding of whether substantial changes are contemplated in computing architecture, and whether the BPDG proposal would be viewed as setting a precedent for government involvement in setting computing standards.

IV. Effectiveness

Any Congressional action on the BPDG report would appear to have two primary goals: protection of DTV content from certain illegal copying and redistribution, and accelerating the rollout of DTV by providing such protections.

To what extent will the BPDG proposal diminish the copyright infringement in question? Implementation will no doubt deter many users of compliant equipment

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ease of integration for television viewers purchasing new equipment or maintaining legacy equipment.

from massive redistribution of DTV content. But questions remain about the extent to which illegal copying will be curtailed.

Analog Hole: Section 2.5 of the Report states that it does not address the so-called "analog hole" — the copying of DTV content after it is sent to an analog component. If the BPDG proposal is adopted, illegal copying could continue through the analog hole.

- In terms of quality, is there really a significant difference in quality between DTV content captured from digital receivers and DTV content captured from analog receivers and redigitized? (Generally speaking, the quality degradation of single digital-to-analog-to-digital conversion is unlikely to be to significant, and the degradation in quality of content currently traded on the Internet typically occurs not in the copying, but in the compression necessary for most Internet transmissions, whether captured from analog or from digital sources.)

The Report and the Requirements Document also do not mention peer-to-peer networking, one of the key problems listed in the studios' April and June reports to Congress.[6]

- What precedent does the broadcast flag set for the peer-to-peer problem? Will the content providers be pushing to close all the holes and address all these issues before releasing DTV content?

Legacy products will also diminish the effectiveness of the proposal:

- DTV receivers sold today do not have restricted outputs, and will not unless some protection system is implemented in coming years. Millions of unprotected legacy receivers — all allowing digital redistribution — will be in the public's hands before this system can be implemented.
- Within a few years it will be possible to do software-based demodulation of the DTV signal on a PC, potentially allowing millions to access DTV signals on computers without the broadcast flag requirements.

Together, these factors would appear to leave substantial possibilities for copying of protected DTV content, including allowing bad actors to obtain content and then redistribute it globally or over P2P networks. Congress should have a clear

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6 "Content Protection Status Report," filed by the Motion Picture Association of America with the Senate Judiciary Committee, April 25, 2002. The same point was made in the MPAA's subsequent "Content Protection Status Report II," submitted in June.

understanding of whether efforts to address these issues will be sought — either by negating the use of legacy products already owned by consumers, or by somehow retroactively addressing issues of the "analog" hole.

Security: A related question is the security of the proposal. A proposal is less desirable if it can be easily defeated, especially if it can be defeated in ways that allow large scale violations while the average consumer is still inconvenienced.

Even on systems for which the Report is implemented, computer security experts commonly believe that most copy protection systems can and will be broken, and that 'marking'-based systems such as the broadcast flag are comparatively weak, in general. Footnote 3 in the Report states that "a more effectual technical and enforcement solution would be to encrypt DTV content at the source (i.e., the transmitter)." We are not suggesting that encryption would be more desirable, but footnote 3 reminds us that a system that fails to protect content adequately at the source is fundamentally vulnerable. Moreover, current DTV receivers do not have protected outputs today and will not in the future — unless some additional protection system is retrofitted for those legacy devices some years from now. By then, it is possible that millions of unprotected DTV receivers will be in the public's hands.[7] Accordingly, the Committee should consider the following:

- How will this system prevent unauthorized redistribution of content when: potentially millions of unprotected DTV receivers will be in the public's hands before this system can be implemented[8] and, within a few years it will be possible to do software-based demodulation of the unprotected DTV signal in PCs?[9]
- How else can the flag be defeated or evaded?

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7 It is hoped that ATSC will improve the 8VSB signal and that many more broadcasters will be transmitting full power DTV signals in the next few years, spurring sales of DTV receivers.

8 It seems possible that, subsequent to an announcement that future DTV receivers will have built-in limitations in compliance with this proposal, consumers may rush out to purchase the remaining stock of non-compliant DTV devices.

9 At least one programmer has created an ATSC-compatible software demodulator that ran on a dual processor PC using two Athelon 1900-Megahertz CPUs. Today's Pentium high-end CPU runs at 2.53 GHz. Assuming the continued applicability of Moore's Law, we should see a 5 GHz CPU in consumer PCs within 18 months – sufficient to accomplish "soft" demodulation of an ATSC signal.

Impact on DTV Rollout: The Committee should explore in greater depth the premise behind the broadcast flag proposal - that DTV adoption will increase as high-value programming is put on DTV, and that this will happen once content is protected from unauthorized redistribution through systems such as that proposed by the BPDG.[10] The Committee should pursue the following question related to this premise:

- Can it be shown that the BPDG scheme will deter enough illegal copying to expedite the deployment of DTV, given that a significant amount of illegal copying will occur even if the proposal is implemented?
- Allowing for an FCC administrative process required by law and sufficient time for implementation, it seems unlikely that the first "compliant" and secure devices would be distributed before mid-2006.[11] Will adoption of the Report result in additional DTV content being released in time to aid in a transition by 2006?

The key question seems to be this:

- Does the Committee feel it has adequate assurances that adoption of the Report proposal via law and regulations will result in the timely release of

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[10] It is important to note that most experts cite numerous reasons for the slow rollout and adoption of DTV. At a recent Cato Institute Conference, Richard E. Wiley, former Chair of the FCC's Advisory Committee on DTV, listed seven "hurdles" other than the lack of copy protection, including: 1) the debate over "progressive" versus "interlaced" scanning; 2) the problems with VSB modulation standard and the effort to replace it with the COFDM standard; 3) the lack of DTV monitors that also include DTV receivers; 4) the lack of leadership of the broadcast networks in providing HDTV programming, including programming for which there are minimal copy protection concerns (*e.g.*, sporting events); 5) the inability of cable set-top boxes to pass through HDTV programming and the lack of cable-ready digital television receivers; 6) the FCC's decision not to require cable systems to carry both analog and digital broadcast stations during the transition period, along with the related decision to require cable systems only to carry a digital broadcaster's "primary video" program stream; and 7) the lack of consumer awareness about the transition and its ramifications. Remarks of Richard E. Wiley, "A Progress Report on the DTV Transition," Cato Institute, May 1, 2002, found at http://www.cato.org/events/020501pf.html.

[11] This assumes legislation sometime in 2002, 18 months to two years for a notice of proposed rulemaking and complex rulemaking proceeding (assuming no legal challenge in the Federal Court of Appeals), and two years to design, build and deploy products following promulgation of the rule. Such products may also have to be designed to include a technological measure, such as watermark-recognition technology, aimed at blocking 'the analog hole.' — see the Motion Picture Association of America's "Content Status Report II," Sec. 1.2, June 26, 2002.

DTV content that will impact the rollout of DTV, even if the analog hole and peer-to-peer issues have not been resolved?

The answers to these questions could help the Committee evaluate the extent to which the BPDG proposal would be effective in moving this nation to transition from analog over-the-air television to digital television. The consumer benefits from this transition (not just in better pictures, but also from the release of spectrum for important public-safety, technological, and economic benefits) could be significant. If, however, the BPDG proposal will not result in a significantly accelerated DTV transition, this casts the proposal in a different light.

IV. What Is the Monetary Cost to Consumers?

The Committee should evaluate the impact of the BPDG proposal in terms of the additional expense it may entail for the 107 million American TV households, both in terms of the cost of DTV products and in terms of the costs of other digital products. Those costs may be felt by consumers both directly (in terms of the need to buy new products) and indirectly (in terms of various ways increased product-development costs may be passed along to consumers). These costs may well delay rather than expedite the transition to DTV. For these reasons, the Committee should ask the commercial stakeholders to provide cost estimates for implementing the solution evaluated in the Report. These questions here are for the consumer-electronics companies (CE) and information-technology companies (IT).

- Section X-3 of the Requirements Document details a number of requirements for protecting Unscreened DTV data. Section X-4 provides similar requirements for protecting Marked Content.[12] The Committee should seek:
    - a block diagram for implementing the Section X-3 and X-4 requirements for protection in a typical DTV device (e.g., a set top DTV receiver, receiver in a DTV set, or DTV receiver card in a PC).
    - an estimate of the cost to engineer such protection in a typical product family.

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12 We understand the term "Marked Content" to refer generically to content that has been marked with the broadcast flag, or with any other technological mark designed to function similarly. See, *e.g.*, the Report Sections 4.6 and 4.7.

- the total estimated engineering cost for such protection for all company's current and planned DTV products.
- An estimate of the cost that will be passed on to consumers in order to comply with Sections X-3 and X-4.[13]

- In addition, we understand that technologies proposed as Authorized Technologies are governed by license agreements and require the payment of licensing fees both by implementers and Studios. (See Report Section 6.6.1 and Tabs F-1, H-1, and H-2.) The Committee should seek answers to the following questions regarding licensing fees and related costs:
  - What are the estimated annual costs of license fees for DTV product lines assuming adoption of the BPDG-evaluated technology and Authorized Technologies?
  - What other costs associated with adopting and utilizing Authorized Technologies are not included in the questions above?

[13] We understand that Section X-3 is not complete, but these questions can be answered on the basis of company's best estimate based on how it believes Section X-3 will be finalized.

V. What Are the Alternatives?

The Report is silent with respect to alternatives.[17] Value-added, competitively priced video-distribution systems may well stem the need to deploy a complex broadcast-protection system. With an eye to preserving trade-secret and other confidential information, we suggest that the Committee ask MPAA to confidentially survey its members and answer the following questions as completely as possible without revealing individual company plans:

- Are Studios planning to roll out digital distribution systems on the Internet and elsewhere, apart from their DTV plans?
- Will these systems include content slated to be protected under the system contemplated by the Requirements Document?
- If few digital distribution launches are planned, why not?

[17] There are, we believe, already alternative protected digital delivery systems that could efficiently deliver high-quality digital video content to consumers through channels other than digital broadcasting, reserving the broadcast channel for "ordinary" digital-television content.. In addition, scheduled secure content-delivery systems such as Microsoft's "Palladium" initiative may reach consumers before the "compliant" products called for in this proposal do so. Without either endorsing Palladium or assuming its effectiveness, we note that, as described in recent reports, the Palladium initiative has the potential to deliver the kind of protection of content sought by the Content companies, but without requiring potentially expensive and slow-to-implement government-imposed technology mandates. Our team of technical experts is divided on the question of whether Palladium will deliver all the protection it promises, but unanimous in believing it more likely to be effective than the broadcast-flag schemes under consideration here.

VI. Conclusion

More dialog must be had with stakeholders, including consumer representatives, to determine the costs and inconvenience of the proposed broadcast-flag system, and to determine whether it can be structured in such a way that responds to consumer interest in flexibility and backwards compatibility. Such a dialog will contribute to another crucial goal: evaluating the Report within a broader context. Some of these larger questions include: what is the precedent for the computer and the Internet; how could a broadcast flag evolve in ways that more deeply constrain consumer control; how does the broadcast flag fit with other DRM ideas, and what are the reasonable alternatives for protecting copyright interests, both in terms of business models and in terms of technology?

In summary, then, we seek to raise the following three sets of issues regarding the BPDG proposal:

- What impact will it have on consumers' ability to use their existing and future electronic equipment in ways consistent with copyright protection, including time shifting and moving legally acquired content from one device to another as they go about their daily lives? To what extent will it affect the development and deployment of new consumer and information technologies?
- There needs to be a realistic assessment of the cost-benefits: (a) how effective will the measure be at solving an identified and documented problem compared with (b) the costs in terms of product costs, limits on legitimate consumer activity, and convenience?
- Finally, from a consumer perspective, what assurance is there that the proposal, if implemented, would lead to the substantial release of digital content and the greater availability and affordability of DTV?

We hope that the Committee will ask the above questions and carefully consider whether enough is yet known about the possible impacts on consumers of implementing the proposal described in the Report. We do not stand in opposition to the principle of content protection for digital television, and we embrace the general principle of the need to protect copyright in the digital age. But we also believe that Congress, in its factfinding and legislative role, must vet and consider the impact on consumers of any content-protection system imposed by regulation. We stand ready to help address these questions.

For further information about this analysis, please contact:

Jerry Berman, Executive Director, Center for Democracy and Technology,
202-637-9800, jberman@cdt.org

Alan Davidson, Associate Director, Center for Democracy and Technology,
202-637-9800, abd@cdt.org

Chris Murray, Telecommunications and Internet Counsel, Consumers Union,
202-462-6262, murrch@consumer.org

Gigi Sohn, President, Public Knowledge,
202-518-0020, gbsohn@publicknowledge.org

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Public Knowledge is a nonprofit advocacy and educational organization that seeks to address the public's stake in the convergence of communications policy and intellectual property law.

Consumers Union, publisher of *Consumer Reports,* is an independent, nonprofit testing and information organization serving only consumers. Since 1936, the organization's mission has been to test products, inform the public, and protect consumers. Its advocacy offices and the Consumer Policy Institute address the crucial task of influencing policy that affects consumers.

The Center for Democracy and Technology works to promote democratic values and constitutional liberties in the digital age. With expertise in law, technology, and policy, CDT is dedicated to building consensus among all parties interested in the future of the Internet and other new communications media.

APPENDIX B

A Public Knowledge White Paper:
Harry Potter and the Prisoners of the DTV Transition

A PUBLIC KNOWLEDGE WHITE PAPER

HARRY POTTER AND THE PRISONERS OF THE DTV TRANSITION

An Adventure in Digital Television Policy
(With apologies to J.K. Rowling)

BY MIKE GODWIN
SENIOR TECHNOLOGY COUNSEL
PUBLIC KNOWLEDGE

(Revised Dec. 6, 2002.)

"With the Internet we have the opportunity to distribute to millions of people for free – the Internet is an extraordinary opportunity, and yet a whole lot of the content community and the broadcast community and the status quo community are all organized to prevent the Internet from being the channel of distribution. … I hope people will come back to Congress some day with a model addressed to how to use the Internet instead of fight it."

- Rep. Christopher Cox (R-CA), of the House commerce committee, at the Hearing on the Transition to Digital Television, Sept. 25, 2002

In the children's novel HARRY POTTER AND THE PRISONER OF AZKABAN, the young student wizard Harry Potter is called upon to cope with the horde of frightening creatures called Dementors who are chasing him. To make a long, well-plotted story overly short, a future version of Harry suddenly appears and waves his magic wand, reciting the spell "Expecto Petronum!" Thus Harry from the Future manages to scare away the Dementors, protecting the Harry of the present.

The transition from analog broadcast television to digital broadcast television (DTV), now an enshrined part of American broadcasting policy, faces its own set of Dementors -- a frightening horde of technical, legal, economic, and social problems. Taken together, the problems look as unbeatable as any

multitude of scary monsters, but making things worse is the fact that many stakeholder factions are at war with each other over issues such as technology mandates, copyright protection, fair use, and so on.

But what if we could somehow look back from the future to today's troubled present debate, wave our own wands, and come up with the spell that magically defeats the problems that bedevil the DTV transition? Such magic, of course, is beyond the abilities of mere "muggles" like us, but it is possible to look back from the future we have long been imagining -- one in which various consumer-electronics and information technologies have converged, and in which the broadband Internet reaches every home -- and come up with our own version of a magical solution.

We must begin, however, with a general survey of the problems each set of stakeholders believes lie at the center of the transition to DTV. While some might reasonably dispute some premise or point or other about each of these problems, *this essay treats all asserted primary problems of the warring stakeholders as essentially valid assertions*, but it also suggests that there may be a win-win solution for all the major players, especially consumers.

I. Problems for Content Industries

The motion picture studios, the national networks, and other companies that produce, publish, or distribute content are particularly concerned over the fact that DTV will mean that high-quality content will be broadcast and recordable by viewers, and perhaps recirculated on the Internet or through other media. Their argument is that digital content broadcast in the clear may be easily grabbed in high-quality form, and, as unprotected content, may be easily echoed to the Internet. This phenomenon, which some Content producers have characterized as a "Napsterization" of broadcast content, could lead to the undermining of the revenue value of high-quality content, which otherwise may be resold to local broadcasters through syndication or repackaged as VHS tapes or DVDs for sale or rental. Here the theory is straightforward: if viewers can snap up high-quality episodes of, say, "Law & Order" from the Internet, such viewers would no longer be part of the audience for rerun or syndicated episodes (thus undermining the value of advertising during reruns or syndicated broadcasts). Furthermore, such redistribution may undercut sales even of TV content repackaged as DVDs, the current high-quality digital-content delivery system of choice for the American consumer. The Content companies worry

that if the viewers are able to record TV content at home that is of the same quality as, or better than, the DVD version, they will redistribute the programming among themselves and will have no motivation to buy that DVD.

One fix for Content -- part of a solution that is currently widely advocated among Content companies -- might be to "mark" all commercial content that needs to be controlled (e.g., with the broadcast flag, or with a "watermark" technology). This "marking" approach must be coupled with a legal or regulatory mandate that some range of consumer equipment be designed henceforward to look for the mark in marked content, and then act upon it (or refuse to act upon it) in some agreed-upon way.

But a second major problem for Content has been this: Other technologists have argued that a "marking" approach creates an immense problem -- it requires a new regulatory infrastructure to mandate that an unprecedentedly broad range of technologies look for the mark in the marked content. It needs a government-administered standardization on the marking technologies, whether flag or watermark. Also, it essentially requires rearchitecting of broad sectors of the IT, Consumer-Electronics, and communications fields. (Some industrial sectors -- especially those that produce niche digital-manipulation devices, as well as new kinds of personal-video-recorder systems like TiVo, might be wiped out by the cost of the redesign, and by the limits on development of new products. At minimum, the marking approach requires the re-engineering of broad sections of product lines.)

Without government regulation and oversight, of course, the marking solution can't work. Manufacturers (possibly offshore) would have little incentive to encumber digital devices with the technical and processing features necessary to make them compliant with the marking rules. Import regulations would be needed to prevent entry of foreign-made noncompliant devices, and customs officials would be in the position of having to determine whether imported components are compliant, for example.

In addition, the proposed fix for Content may also require new regulatory controls over analog-to-digital and digital-to-analog technologies -- technologies that are currently ubiquitous and cheap, but that, because they may ignore or even strip out the broadcast flag or other kinds of marks placed in digital content, form part of what Content has termed "the analog hole." But control of analog-to-digital or digital-to-analog technologies may make

them more expensive and less functional. Worse, this may add hidden, unanticipated costs to devices not traditionally considered to be within FCC jurisdiction (e.g., astronomical observation tools and certain types of medical monitors).

Nevertheless, the marking-plus-regulation solution has appeal with many sectors of the Content industry. But this proposed solution to Content's problems puts Content at odds with some sectors of the IT industry, with the CE industry, and with consumers. This has led to the equivalent of trench warfare in the legislature, in the courts, and in public opinion. So far, there have been no clear victories for any faction of stakeholders.

But Content believes it *desperately needs a solution* to the problem of how easily its premium content is translated and distributed to the Internet. Content companies currently rely on being able to repackage and resell prime content in a number of ways in order to recover investment and production costs. As noted above, these include syndication and VHS and DVD repackaging for retail sale. These revenue streams currently are a major subsidy of new content production in the movie and TV worlds. Content feels its back is against the wall, and must use every strategy to regain control of its content in a digital world. Content companies believe the current slump in sales of music reflects what would face movie and television production systems if controls are not put in place as soon as possible.

II. Problems for Computer, Software, and Internet Companies.

Information technology companies are also facing flattening sales in many sectors, and so are acutely focused on the possibility that consumers will reject new products that may be more limited than older ones in how they deal with both commercial content and user-generated content. In the computer and software industries in particular, company leaders take as a given that consumers in these markets expect more and better functionality from both sectors on a relatively short cycle. It is unclear how consumers will feel about new devices that, while faster, have less functionality than the old ones do. Some feared responses: "Every cycle my computer spends on checking whether I'm making an unauthorized copy is a cycle it isn't using on my work!" "Why can’t I move digital video that I myself made back and forth between my

computer and my DV camera?" "This computer takes longer to load media files than my old one did." And so on.

Plus, the regulatory scheme favored by Content has to make many classes of hardware and software "untamperable" -- that is, difficult to modify, or "closed." The problem here is that "open platforms," such as the PC and the Internet, have by their very openness encouraged innovation. Such innovation includes the Internet as we now know it, the World Wide Web, Linux and other open-source software, and graphical browsers. Not least important -- the rapid development in this sector has also led to technologies that make content-generation, such as filmmaking and music-recording, much cheaper and more accessible than it used to be. The GNU/Linux problem is particularly acute -- while Linux-based operating systems are widely regarded as one of the few remaining serious competitors to Microsoft in the operating-system market, a regulatory requirement that, say, Linux-based software media players both check for "marked" content and be "untamperable" would, in effect, outlaw Linux versions of such products. (Linux programs are accompanied by their "source code" when distributed, or else simply *are* distributed as source code, which means that they are inherently open and tamperable.)

But suppose the regulatory scheme, recognizing the competitive value of Linux and other open-source software, carved out an exception from the untamperability requirement. Not only would the exception add up to a big hole in the proposed content-protecting regulatory scheme, but it would actually put proprietary software companies at a disadvantage in competing with Linux in the media-player market (since Linux-based players could be modified by any programmer to add functionality and/or remove content protections).

In effect, the "untamperability" requirement creates a dilemma -- either permanently disadvantage open-source software (and perhaps lock in Microsoft's market dominance) or else permanently disadvantage proprietary software, including Microsoft's (and thus, in effect, promote Linux as a matter of a industrial policy).

For Internet companies, any regulatory obligation to monitor for copyrighted content signifies substantial redesigning of the Internet as it has existed and grown since its beginnings more than three decades ago. This is partly because the problem for Content of "Napsterization" (see Section I above) of large-

scale unlicensed copying is not merely that peer-to-peer applications are widespread, or that the number of peer-to-peer file traders is growing -- it is that peer-to-peer file-trading is, in a deep sense, a part of the Internet's fundamental design. (Specifically, the Internet was designed to allow the sharing of data and other resources among computers on a distributed, decentralized network. Digital music files, to take an obvious example, may be considered just another kind of data.)

Further complicating the Internet's fundamentally peer-to-peer character is a deeper problem: what each computer does, at a fundamental level, is make copies. It copies information from one part of memory to another, from memory to hard drive and back again, from memory to video and so on. The Internet itself also works by copying -- transmitted data typically are divided into "packets," which are then copied and recopied from computer to computer on the Internet until copies of all packets reach the destination computer and are reunited into a perfect copy of the transmitted information. Rearchitecting basic computer technologies to limit copying generally, or to police copying, risks affecting the fundamental functionality of computers, which in turn could affect their fundamental usefulness both to individuals and to industry.

III. Problems for Congress

For a number of policy reasons (perceived benefits to the public, more efficient use of the broadcasting spectrum, higher-quality broadcasts, and so on) Congress has mandated a transition from analog television to DTV.

Complicating this, the federal government has established the year 2006 as a nominal deadline on the transition, assuming at the time the deadline was set that the general public would see the value of DTV (particularly high-definition television, HDTV, but also other DTV features) and buy new TV sets, with digital tuners, to take advantage of these features. To oversimplify the matter for a moment, we may say that Congress essentially "loaned" broadcasters extra spectrum to develop DTV (and the DTV audience), but the "loan" has not produced the expected consumer buy-in.

Making things still more problematic, Congress has based its tax and budgeting decisions for the next few years on the assumption that the "analog spectrum" would be returned, and then could be allocated for public-service purposes

(e.g., unlicensed use or public-safety bands) as well as auctioned off for revenue purposes (e.g., for implementation of 3G or WiFi networks), with the latter perhaps generating tens of billions of dollars of income for the government.

As we approach the deadline, however, the increasingly evident lack of significant consumer purchases of (relatively expensive) DTV broadcast receivers means Congress faces the prospect of telling voters that their analog TVs -- including the new, big ones they buy just this year or next year, or in 2004 -- are going to be either wholly obsolete, or will require the purchase of some kind of converter box to continue to work. There is no serious doubt that voters will be unhappy about having to buy new, more expensive TVs or somewhat less expensive adapter boxes, just because Congress has said they must. (An unfortunate side effect of the converter interim solution is that, by adapting legacy devices to receive digital broadcasts, the government may in effect be equipping legacy home-entertainment equipment to facilitate the very kind of "analog hole" infringement that deeply troubles Content companies. Converter boxes will turn certain kinds of high-quality digital content into reasonably high-quality analog content, and such content may ultimately be redigitized and distributed for free on the Internet and elsewhere. Thus, part of Congress's solution to the transition problem may in fact worsen concerns for Content stakeholders.)

But the alternatives to the analog-spectrum give-back deadline have their own problems -- pushing back the transition date (or allowing it to be pushed back by broadcasters, who can rightfully claim that none of them has achieved the 85-percent penetration of DTV into the broadcast audience required by the federal mandate and so are entitled to a delay under the terms of the mandate) throws off budget and tax calculations, and would force a revenue shortfall, which in turn would force Congress to make other hard decisions that also may irritate or disappoint voters in other ways.

(Not incidentally, Congress has also attempted to promote adoption of broadband Internet services. As with digital television, consumer buy-in has not been as fast as hoped -- various Congressional leaders have blamed lack of compelling content as a cause of too-slow broadband subscriber growth. For e-mail and basic Web services, 56KB modems continue to be enough for most current consumers. The issue of promoting broadband adoption turns out to be linked to the issue of promoting DTV adoption, as we shall see below.)

IV. Consumer Electronics Industry Problems

Quite rationally, the consumer-electronics (CE) sector likes selling high-margin, high-quality, high-resolution TV display devices, but knows that just about all of its customer base for current sales of digital TV display devices gets its content from cable, satellite, or DVD, and scarcely ever directly from over-the-air digital broadcasting.

Tuner mandates (such as the recent dual-tuner mandate from the FCC) mean added expense on a per-unit basis at a time when CE was hoping that economies of scale would reduce per-unit cost and get more buyers into electronics stores for crisper or even "cinema-quality" TV displays. It bears mentioning in passing that CE companies now have an incentive to move entirely into the computer-monitor business and abandon selling "TV sets" (monitors plus tuners) altogether. This would allow them to escape the tuner mandate (they might in good faith sell modular dual tuner boxes on the cheap, but perhaps only a small fraction of Americans would buy them) and continue to sell high-quality visual displays that would function equally well on computers or as part of home entertainment systems -- attached, for example, to cable set-top boxes.

Complicating the question of requiring digital TV tuners, there's a looming problem that has not even begun to be addressed: In-the-field tests of digital tuner-equipped TVs suggest that the broadcast digital TV reception is not as reliable as is that for analog broadcasting, possibly due to lack of robustness of the 8VSB transmission standard (multipath interference tends to kill reception altogether, whereas in analog receivers it might merely cause tolerable static or "ghosts"). The New York Times reported the following on September 12, 2002: "In reception tests from the 64th floor of a New York skyscraper using a rabbit-ears antenna, Mr. Schubin and his colleagues were able to pick up only three of the nine digital stations in the New York area that were then broadcasting." Experiments in other cities are reported to have shown similar functionality problems. Given this unreliability of digital broadcast reception based on the 8VSB standard, Manhattan Institute scholar Thomas Hazlett has suggested, not entirely unseriously, that it would be cheaper simply to require viewers to *pretend* they can receive digital television broadcasts. See his article on Slate at <http://slate.msn.com/?id=2071935>.

In short -- the FCC is currently ordering the added expense for dual tuners, but the digital tuners may not work as well as analog TV receivers. This is not the kind of the industrial-policy decision that inspires consumer confidence and willingness to buy new TV displays -- a drop in consumer confidence that could seriously damage sales of CE products. Worse, some voters may decide to blame government policy decisions for their disappointment in this area as well.

V. Problems for Consumers

It is going to be difficult to persuade ordinary television consumers of the necessity of having to abandon or else pay for converter boxes for their perfectly functional analog television receivers.

It has already been effectively demonstrated that consumers do not yet value the proposed benefits of DTV enough to invest seriously in new equipment for it, except to the extent that a narrow subset of consumers prefers digital TV displays for purposes of DVD playback or digital cable or satellite content.

Those consumers who do not subscribe to cable or satellite, but who instead rely primarily on over-the-air broadcast signals, may find that their new digital TV set receives broadcast content less reliably than old analog set did (see, e.g, the discussion of the multipath interference problem in Section IV above). This government-compelled "downgrade" in reception reliability is likely to make a significant number of broadcast-reliant voters unhappy.

It must also be noted that efforts to control analog input-output interfaces, recorders, and display devices, in order to ensure the effectiveness of the broadcast flag or other "marking" schemes, may spell the end of plug-and-play interoperability among consumer electronics devices -- an interoperability that every Radio Shack or Sears customer, for example, has come to expect.

VI. Problems for Broadcasters

Broadcasters aren't just facing the problem that 8VSB-transmission broadcasts are currently less reliably received than analog broadcasts are. They're also

facing a worse problem: Soon the bill for "loaned" spectrum will come due (more precisely, the due date for return of the "analog spectrum" will arrive). The date will come when the mandated transition is set to happen. But based on the available evidence, most TV watchers haven't bought into the value of DTV yet. If the transition were to be imposed by Congress or the FCC on the date when it has been scheduled, there would be an abrupt decline in the advertising audience base for broadcasters (especially compared to the audience base for cable and satellite, which won't be affected by broadcasters' decline in audience and probably will opportunistically grab some or all of the disaffected broadcast audience).

Furthermore, the generally high costs of having to refit their broadcasting plants to enable DTV broadcasting are, for many broadcasters, an "unfunded mandate" -- expenses they are required by law to make as licensees (and may already have begun to make), but that do not (or at least not yet) translate into additional revenue.

Historically, one argument for promoting the transition to DTV has been to enable broadcasters to compete against the heretofore more reliable signal and multichannel capability of cable- and satellite-delivered TV content. It would be ironic if a policy designed to achieve the goal of preserving the tradition of free broadcast TV content (subsidized, of course, by advertising) were in fact to hasten the end of that tradition.

VII. What is the Harry Potter Fix?

This paper does not purport to address the purely political problems that must be overcome to address the range of technical and economic problems associated with a compelled transition to digital television. Instead, its purpose is to suggest an "outside the box" set of solutions -- the "magical" solution in which, regardless of the politics and regulatory complexity of all the issues surrounding DTV, content protection and the like, Harry Potter (under our guidance) waves his wand, says the magic words, and all major requirements of every major stakeholder group are met.

We begin with three basic steps.

Step One: Congress sticks with the 2006 deadline for return of extra spectrum, but allows broadcasters to choose which spectrum they return -- i.e., they can keep their old analog spectrum or their new "digital" spectrum, but must give back at least one or the other -- subject to a possible exception explained below. (This step assumes for the sake of simplicity that spectrum is fungible -- the actual implementation of the giveback will be somewhat more complicated due to technical allocation issues, but compared to the current state of affairs, allocating the giveback is relatively straightforward.)

Step Two: Allow broadcasters to continue analog TV broadcasting if they wish. (Some may choose to continue to experiment with digital, but advertising-based broadcasters will want the largest possible audience, and the biggest audience share of those receiving broadcast signals are doing so with "legacy" analog receivers, which continue to be sold in much higher volume than DTV receivers, even at this last date.) Broadcasters who may want to keep broadcasting analog signals but who also want to continue to build out to, or experiment with, digital broadcasting may choose to buy additional spectrum for that purpose, more of which should be available once the "loaned" spectrum has been reclaimed by the government. All broadcasters who continue to broadcast digital signals might be allowed to choose between the 8VSB standard and any other standard that might work more effectively (e.g., the COFDM standard now prevalent in Europe).

Step Three: As a condition of continuing to hold their licenses, the FCC must require all national networks to "netcast" their primetime and late-night programming, and all broadcasters to "netcast" their locally generated programming, over the Internet. Of course, Internet distribution of licensed creative content from TV and movie production companies will necessarily be worrisome for copyright holders -- such worries, they may interject at this point, are their very basis of their current marking-plus-regulation proposals like the broadcast flag -- so the FCC must also allow content licensors to insist that delivery of licensed content be done through one or more of the current or future secure digital multimedia content delivery systems of the broadcaster's choosing -- e.g., RealPlayer, QuickTime Streaming Video, Windows Media Player, or various Palladium-based schemes soon to be deployed. All of these systems, plus a number of others, offer reasonably secure delivery that prevent all but the most determined viewers from making unauthorized copies of content. (They are not entirely "hack-proof," but in this, they have very much the same described degree of functionality of proposed broadcast-flag and

other marking schemes -- in purely practical terms, they may already be said to offer more protection per dollar than marking schemes do, in part because they are less costly to implement.) Of course, broadcasters may also choose to deliver some of their own content -- perhaps advertising-subsidized local original programming -- in the clear, and there may also be instances in which copyright holders discover they want to authorize or even encourage broadcasters to deliver certain of the copyright holders' content in the clear.

VIII. What Are the Advantages of Harry's Magic Spell?

(1) First and foremost, consider the advantage to Content companies in the secure-delivery-system requirement: There is already actual market competition in this delivery-system sector and multiple major players, including Real Networks, Microsoft, and Apple. The existence of genuine market competition in the secure-Internet-delivery space is necessarily going to be more protective of copyright interests than any government-mandated standard could be. This is because market-driven DRM solutions can evolve more rapidly and respond more quickly to new copyright-security problems, etc. Although for antitrust reasons the FCC would certainly not want to allow Content licensors to dictate which one of the competing systems must be used (because that would permit them to leverage their copyright interests into control over commerce in areas outside of their copyrights), it would nevertheless be possible for the FCC to allow Content licensors to insist that licensees select a system (be it a codec, DRM, media player, or other component) which meets specified technology-neutral minimum security standards.

(2) There's yet another advantage: secure Internet delivery of high-quality content gives more Americans exposure to the quality of HDTV and other high-quality DTV offerings. Recent statistics suggest that PC penetration into American households approximates that of cable -- about 70 percent. Current PC monitors, including analog monitors, are excellent DTV (and even HDTV) display devices, at least for DVD currently. DTV-Internet offerings may spur demand for even better, "cinema-quality" devices.
Note: This plan takes into account that even the "fastest" home broadband Internet connections would require many hours of download time to deliver digital television, even if we assume the DTV is simply 480p content (DVD quality). True HDTV -- 720p, for example, or 1080i -- would require still more

time to download (speaking optimistically, about 19 hours of download time per hour of 1080i content, and 14 hours of download time for an hour of 720p content -- double those download-time numbers for a two-hour movie). This is almost certainly the explanation for the absence of any significant degree of HDTV infringement on the Internet currently, even at high-bandwidth-capable sites like research institutions and universities, and even though consumer devices capable of capturing HDTV to computer files already exist.
(See, e.g., the following URLs:
<http://www.projectorexpert.com/Pages/tvcards.html>
<http://www.hauppauge.com>, and
<http://www.digitalconnection.com/Products/Video/hipix.htm>).

Content companies -- some of whom, like CBS, already deliver original content, including entertainment content, in unprotected HDTV form now -- typically acknowledge that the broadcast-flag and other "marking" solutions for protecting high-quality digital television are *anticipatory* measures. That is, they are not addressing a current problem of infringement of true HDTV content (and not even of 480p digital content, which takes four hours or more to download per hour of content), but instead a problem they believe will appear when Internet bandwidth is expanded.

But we also know that, for infringers at least, waiting hours for downloads to complete has not historically been considered a serious problem, even on the current Internet. In addition, it is widely believed (although not undisputed) that Internet bandwidth to the home is likely to continue to increase over the coming years. Many of the early Napster users waited a long time for MP3 files to complete their downloading over 56Kb modem connections. The same is now true for those who download (typically degraded) movie and television files through current individual-subscriber broadband connections.

This aspect of file-trading points us to a larger fact about Americans in general -- to wit, we must keep reminding ourselves that actual "live" delivery of television is increasingly less important to Americans, which explains, among other things, the widespread adoption of VCR and PVR time-shifting. Current Internet bandwidth probably does not support "live" HDTV except on rare occasions, with long download times that require buffering and other interim fixes. But we may reasonably assume that properly jumpstarted demand for broadband-delivered DTV will fund the kind of infrastructural build-out required to enable quicker or even "real-time" HDTV content delivery. Non-simultaneous delivery of premium content probably can be facilitated by "buffering" through intermediate Internet servers, and may even constitute a

new application for pure "peer-to-peer" distribution. It would be a great irony if the Internet's "peer-to-peer" functionality, previously seen by many policymakers as an unmitigated problem, could be harnessed to enhance the delivery of commercial content in ways that financially benefit Content producers and distributors even as they increase consumer choice.

(For a discussion of how an asynchronous TCP/IP delivery model might work, see Craig Birkmaier's article at <http://broadcastengineering.com/ar/broadcasting_internet_broadcasting_rip/>.)

As noted at the outset of this essay, the Harry Potter solution assumes for the sake of the argument that Content companies are correct to believe there actually is the potential for serious infringement of HDTV content over the Internet, in spite of the large file sizes and tight bandwidth bottlenecks discussed in this subsection -- perhaps Content's belief is based on the anticipation of more and better bandwidth someday soon. If in fact there is not enough bandwidth to allow for the Harry Potter solution to work, it follows then that there also is not enough bandwidth to allow for Internet piracy of HDTV content. The Law of the Excluded Middle applies -- if there is bandwidth enough for infringement, then there's bandwidth enough for netcasting. Alternatively, if there is inadequate bandwidth for netcasting as I have described it, then there is inadequate bandwidth for the infringement threat as Content has described it.

(3) Still another advantage -- the Consumer Electronics sector still gets to sell high-quality computer monitors (essentially TVs without tuners), and may sell many more as audiences discover alternative ways to access DTV content. (This trend accelerates if the CE sector is released from its tuner mandate as part of an overall strategy to use the Internet to promote DTV.) CE may also continue to sell higher-quality analog display devices as well, of course. Analog displays can often be used for high-quality output of digitally originated content -- that, in fact, is what many high-quality computer monitors (more often than not, analog devices) are already doing. (See the discussion about capturing HDTV in the Note in the preceding subsection.)

(4) A major consumer advantage -- Under this scheme, broadcasters can experiment with offering "must-see" TV at times convenient to audiences, or more than once, with advertising that also may be seen more than once, or advertising that can be changed from day to day with the same program offering! As far as the TV viewer is concerned, there is an immediate improvement in convenience: Instead of waiting until Thursday night to see the new episode of "Friends," you click on the "Friends" Web-link anytime you want

to during the week the current episode is showing. (This is just one possibility -- there may be a lot of experimentation in varying this kind of offering. Another experiment may be to give viewers a choice between advertising subsidized "free" primetime content and subscription-based ad-free versions of the same programming -- in other words, a viewer could choose to treat a network more like NBC or more like HBO.) Perhaps you even could choose on Monday night to receive "Friends" on Wednesday night -- since "live" broadcasting is less relevant to many TV viewers, your advance choice allows the program to be buffered either in your system or in nearby servers, ready for the final click to order its display.
Such choice might matter more to TV viewers even than the high-quality images of HDTV. (We note in passing, that for 90 percent of Americans, 480p, the DVD standard, is the very definition of digital video content -- in the near term, digital broadcasts may be primarily in DVD-like formats, with increasing excursions into HDTV content as the consumer buy-in and broadband capacity both increase. A show like "Friends," which is character-driven and joke-driven, may need true HDTV visual quality rather less than, say, a network-based netcast of "Lawrence of Arabia" or "Attack of the Clones.")

IX. How Do Consumers Benefit?

The first and most obvious advantage is this: There would be no need to junk old TVs, which can still get old-style analog signal from broadcast, cable, or other means (mediated, perhaps, by "legacy" VCRs and TiVo-like programmable devices).

As far as consumers' copying expectations are concerned, we note first of all that consumers could still do fair-use time-shifting (and other legal but unlicensed uses of commercial content) with their VCRs, TVs, TiVos, ReplayTVs, eyeTVs, WinTVs, and other "legacy" digital and analog devices, including PC capture devices, so long as there is continued analog distribution. But, perhaps more important in the long run, market competition among secure delivery systems might also be expected over time to offer similar fair-use features in the purely digital arena as well, especially now that we've refueled the market for competition in that delivery-system sector. (Alternatively, if the new delivery systems do not adequately accommodate fair-use and other legal but unlicensed uses of commercial TV content that are government-supported as a matter of public policy, that might be cause for FCC regulation or other

government intervention. But for the purposes of this essay we begin by assuming that market competition will tend to approach user expectations on its own.)

But apart from protecting consumers from having to reinvest seriously in their home-entertainment systems before they are ready to do so, this proposal also promotes consumer adoption of DTV! As far as consumer experience of and acceptance of DTV go, under this scheme consumers will increasingly have the opportunity to compare on a requlr basis the differences between analog and DTV content, and make household IT, CE, and Content investment choices based on actual experience of the difference.

In the short term, consumers' investment in new equipment is primarily in (a) computers, which families are increasingly buying (or upgrading and replacing) anyway, and (b) broadband connectivity, for which Congress has been trying to spur demand, in order to fund infrastructural build-out, among other things. (Consumers with slower computers will likely find new inspiration for buying faster ones, assuming they have an interest in full-motion video content delivery through their PCs. Consumers with slower connections will likely find new inspiration for buying greater bandwidth. These factors may have the incidental salutary effect of reinvigorating the personal-computer market and Internet infrastructure growth as well as promoting DTV. It should also be noted here that households that buy TVs tend to keep them operating for 10 or more years -- what we know of computer-buyer patterns suggests that PCs are upgraded and/or replaced rather more frequently.)

X. What about the IT Sector?

Once Harry's wand is waved, the IT sector works without being encumbered by government-set technology mandates, and actually gets to compete for developing secure content-delivery systems. Computers and software remain largely open for industries and individuals to explore and innovate. Increased demand-driven investment in broadband infrastructure capacity creates an even broader "open platform" for new kinds of high-bandwidth products and services.

And if consumers don't like particular DRM solutions, they can either "vote with their feet" -- either moving to alternative delivery systems and media

players or sticking with analog content delivery -- or vote in other ways, perhaps by asking the government to intervene and regulate DRM. Provided the choice of secure delivery systems is left to the broadcaster (who might, in turn, give consumers some choices among multiple supported media players), it is to be hoped that competition alone will be enough to create the incentive for continuous innovation in these key delivery components, driving down price while improving ease of use, quantity of features, and quality of playback. (Competition may well be enough: Consumer feedback about copy-protection schemes revolutionized the software industry in the 1980s, for example -- the result was that most commercial software companies either abandoned copy protection or developed protection schemes, such as registration, that were less onerous for ordinary users.)

XI. And What Will the Broadcasters Get?

Broadcasters who want to continue both to offer analog signal to their audiences and to experiment in digital TV broadcasting, and who also have already invested in building out their digital-broadcast infrastructure, might be allowed to keep, say, a percentage of "loaned" spectrum as a kind of "good faith reward." These broadcasters can either continue to experiment with digital broadcasting offerings or sell off their spectrum grant to recover investment costs.

Local TV broadcasters in particular will benefit. Not only will they be able to preserve their existing geographically based audiences (by not requiring them to abandon their old TVs and buy new, more expensive ones) but they also will be able to reach new audiences around the world. This has the advantage of helping to fulfill the FCC's long-standing tradition to promoting diversity of programming -- an innovative local program has the potential to reach a national or international audience. (This has already been the experience of broadcast-radio stations that have echoed their programming to the Internet.) Plus, reaching that larger audience means more advertising dollars for advertising-subsidized broadcasts.

XII. What's the Biggest Win For Congress?

In a nutshell: Congress cuts the Gordian knot of the DTV transition problem.

It achieves the goal of promoting the transition to DTV, but does so without compelling any new expenses for TV consumers and without imperiling free broadcasting (indeed, it offers an expanded set of models for how free broadcasting can work profitably).

This policy not only promotes digital delivery of premium content, but also couples that to a policy that promotes content protection through market competition. (Content companies will also benefit from the competition in the DRM and media player space, of course.) Finally, it promotes both DTV buy-in and broadband buy-in within the same consistent policy structure.

The stalled development of DTV content delivery, including HDTV experimentation, will be jumpstarted by the Internet broadcasting ("netcasting") mandate imposed on broadcasting licensees.

Congress will get its "loaned" spectrum back, and will be able to auction most of it off, consistent with budgetary plans, while reallocating portions of the spectrum for particular public-benefit purposes, including the new possibilities enabled by setting aside unlicensed spectrum for public use.

In short: Every major stakeholder bloc will benefit, and consumers will be minimally inconvenienced, if at all, by the transition. All the prisoners of the DTV transition will be set free and are likely to see immediate benefits, due to Harry's plan's reliance on existing delivery systems, content protections, infrastructure, and other technologies.

Will Harry's wand-waving implementation of our plan work? Maybe, if we set our imaginations free enough to find alternatives to the current zero-sum deadlocks. Let's hope we don't have to wait until 2006 for the sequel.

For further information about this paper, contact:

Gigi B. Sohn, President, Public Knowledge, at 202-518-0020 or gbsohn@publicknowledge.org
Mike Godwin, Senior Technology Counsel, Public Knowledge, at 202-518-0020 or godwin@publicknowledge.org